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Environment  
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Environmental  
Conservation  
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Environnement  
Canada

Service de la  
Conservation  
de L'environnement

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# NATIONAL WATER RESEARCH INSTITUTE

DIRECTORY OF STUDY PLANS  
1984-85

INLAND WATERS DIRECTORATE



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NATIONAL WATER RESEARCH INSTITUTE  
DIRECTORY OF STUDY PLANS

1984-1985

NATIONAL WATER RESEARCH INSTITUTE  
CANADA CENTRE FOR INLAND WATERS  
P.O. BOX 5050  
BURLINGTON, ONTARIO  
L7R 4A6

MAY 1984



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INTRODUCTION  
DIRECTORY OF STUDY PLANS 1984-85

The National Water Research Institute

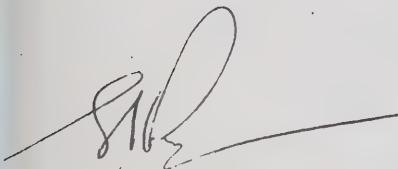
This Directory provides the seventh annual indexed catalogue of planned research, development, engineering, scientific service and support service projects of the National Water Research Institute of the Inland Waters Directorate, Environmental Conservation Service, Department of the Environment, for the Fiscal Year 1984-85.

This report is an internal document developed for operational purposes.

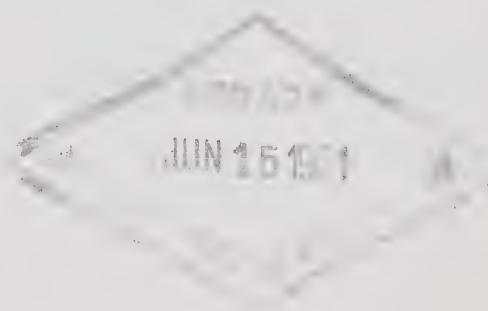
Programs internally are represented by the Divisional structure, designed to meet management requirements and Directorate program thrusts.

The relation amongst the management units is illustrated in the chart on the following page.

If it is required, more detailed management and scientific information is available from the managers and project leaders.



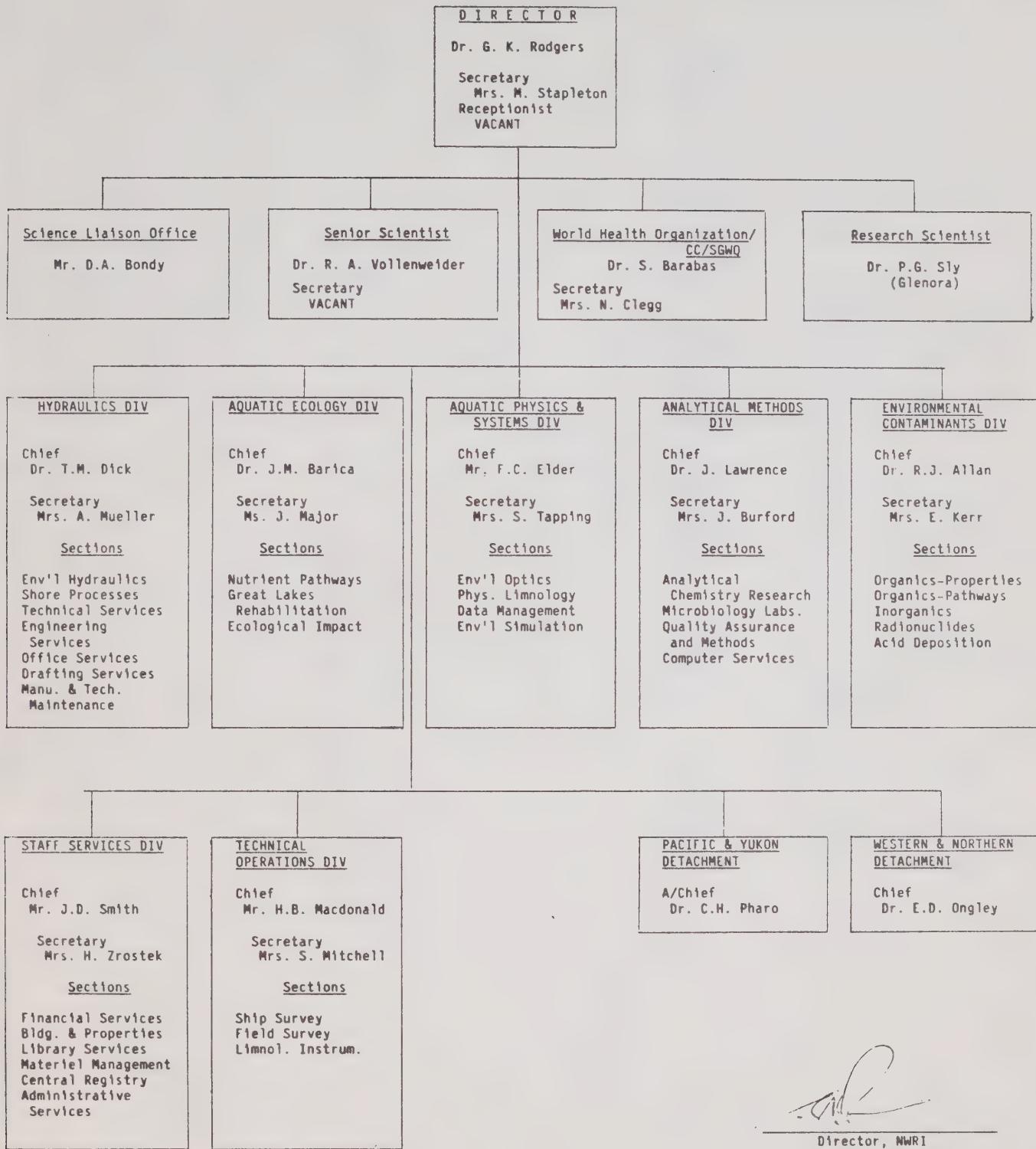
G.K. Rodgers  
Director



May 10, 1984



NATIONAL WATER RESEARCH INSTITUTE



  
Director, NWRI  
March 1984/0323d



**Key to Divisions and Sections**

<b>Division</b>		<b>First Digit of Study No.</b>		<b>Section or Group</b>
Director's Office	NWRI	1	BRANCH	
			RESRCH	Research & Liaison
			WHO/CC	World Health Organization/ Collaborating Centre
			PY/RGN	Pacific & Yukon Region
			WN/RGN	Western & Northern Region
Environmental Contaminants Division	ECD	2	ECDDIV	Environmental Contaminants Division
			OPROPS	Organics Properties
			OPATHS	Organics Pathways
			INORGS	Inorganics
			RANUCS	Radionuclides
			ACDEPS	Acid Deposition
Hydraulics Division	HD	3	HDDIV	Hydraulics Division
			OFSRVS	Office Services
			TCSRVS	Technical Services
			ENSRVS	Engineering Services
			EHS	Environmental Hydraulics
			SHORES	Shore Processes
			MANTEC	Manufacturing and Technical Development
			DRFTG	Drafting & Illustration
Aquatic Ecology Division	AED	4	AEDDIV	Aquatic Ecology Division
			EMPACS	Ecological Impacts
			GLRLHS	Great Lakes
			NUPROS	Nutrient Pathways

Division		First Digit of Study No.		Section or Group
Aquatic Physics and Systems Division	APSD	5	APSDIV ENVSIM PHYSLIM ENVOPTIC DATAM	Aquatic Physics & Systems Division Environmental Simulation Physical Limnology Environmental Spectro Optics Data Management
Analytical Methods Division	AMD	6	AMDDIV ACRS MLS QAMS CSS	Analytical Methods Division Analytical Chemistry Research Microbiology Laboratories Quality Assurance and Methods Computer Services
Technical Operations Division	TOD	8	TOPDIV FIELD/S SHIP/S LIM/INST	Technical Operations Division Field Survey Ship Survey Limnological Instrumentation
Staff Services Division	SSD	9	SSDDIV MATRL CR FINS B/PROS LIBRAS	Staff Services Division Materiel Management Central Registry Finance Building & Properties Library Services

1984/85 NWRI Program Activity Elements

ECS Program	PAE Code	Activity Element
----------------	-------------	------------------

1.1 Canada-U.S. and Interjurisdictional Water Management

1113 National Water Research Institute and Regional Involvements in Canada-U.S. and Interjurisdictional Water Management

1170 International Relations

1.3 Water Quality Management Data

1312 National Standards Laboratories at NWRI

1.4 Water Quantity Management Data

1430 Calibration of Hydrometric Equipment (NWRI)

1.5 Water Management Research

1511 Environmental Contaminants (NWRI)

1512 Aquatic Physics and Systems (NWRI)

1513 Hydraulics (NWRI)

1514 Aquatic Ecology (NWRI)

1515 Analytical Methods (NWRI)

1516 Centralized Support Services for Water Management Research (NWRI)

1532 Water Research: General

1.6 Management and Administration

1611 Regional/HQ/Institute Management

1620 Program Planning, Evaluation, Policy and Advice

1630 Financial Support Service

1631 Administrative Support Service

1650 Physical Plant

1660 Library Services

1670 Other Support Services

**4.1 Toxic Chemicals**

4100      Toxic Chemicals

**4.2 Long Range Transport of Airborne Pollutants**

4200      Long Range Transport of Airborne Pollutants

**4.3 Environmental Assessment & Baseline Studies**

4300      Environmental Assessment & Baseline Studies

### Key to Funding Source

APWA	American Public Works Association
CCP	Canadian Climate Program
CWA	Canada Water Act
DFO	Department of Fisheries and Oceans
ENV2K	Environment 2000
EPS	Environmental Protection Service
FIP	Federal Internship Program (formerly COSEP)
FPB	Facilities Planning Branch
GLWQA	Great Lakes Water Quality Agreement (Canada-U.S.)
IWD	Inland Waters Directorate
LRTAP	Long Range Transport of Airborne Pollutants 1984/85
MTC	Ministry of Transportation & Communication
NH&W	National Health and Welfare
NWRI	National Water Research Institute
PARKS	Parks Canada
PERD	Panel on Energy Research and Development
PPWB	Prairie Provinces Water Board
SCH	Small Craft Harbours
TCMP	Toxic Chemicals Management Program
UNESCO	United Nations Education, Science & Cultural Organization
WHO	World Health Organization
WQB	Water Quality Branch, Inland Waters Directorate



## Key to Operational Contacts & Interest/Direct – General

The purpose of the Research Communication Strategy is to:

- foster beneficial communication between IWD research and operational communities,
- identify operational research issues and needs consistent with departmental priorities, and
- ensure that as many as possible of these research issues and needs are addressed by the Institutes.

The elements comprising the strategy are as follows:

1. IWD Regions and Headquarters Branches will provide the Reasearch Institutes descriptions of new problems and research ideas relevant to their operational programs. The HQ Directors will also send their overview perspective to the Institutes. These will provide a basis for discussion during the research review meetings and for the development of Research Study Proposals.
2. An annual research review visit will be made by a Research Institute team to each region.
3. Institute Directors will then assemble Research Study Proposals prepared by the researchers for the subsequent fiscal year. The input for the preparation of these will include, but not be limited to, the research needs identified by the Regions and the results of the research review visits.
4. The Research Institutes will send copies of their Research Study Proposals to the Regions and HQ Branches for the following action:

Operational Directors will ask their staff to classify the studies as follows:

- i) Direct Interest - In the opinion of operational staff there is a high probability that the results of these studies will be useful within an operational program.
- ii) General Interest - Included in this category are studies considered generally relevant to operational programs but for which there is enough uncertainty regarding the possible application of the results that investment of operational staff time is not warranted.

5. When a research study has been identified as "Direct Interest" by a Branch or Region, the Director concerned will designate a staff member to act as Operational Contact for this research. If the study is approved as part of the research program for initiation (or continuation) the following fiscal year, the Operational Contact will communicate with the researcher and discuss the relevance of the research study to the Branch/Regional program, learn enough about the research study to explain it to his operational colleagues, and follow progress of the research, by periodic consultation with the researcher as appropriate until useful results are achieved. The Operational Contact should provide a one page report to his Director, with a copy to the relevant Institute, describing progress to date and the practical applicability of the results. These will assist the researchers and Institutes in preparing proposals for on-going research studies for the subsequent fiscal year and provide management with a critique of the practical application of the research.

6. If a Research Study is identified as being of "Direct Interest" to more than one Region or Branch, the corresponding Research Institute

Director will, on consultation with the relevant Branch/Regional Directors, name a lead operational contact who will be responsible to keep the other interested Branches and/or Regions fully informed.

7. The names of the operational contacts are published with the associated research studies in the Directory of Study Plans. Most studies had several operational people expressing their interest in a study but only the lead operational contacts are shown here.

Key to Operational Branches and Regions of IWD

RCPE	- Research Coordination and Program Evaluation Branch (HQ)
WQB	- Water Quality Branch (HQ)
WP&M	- Water Planning and Management Branch (HQ)
WRB	- Water Resources Branch (HQ)
HQ	- Headquarters
NWQL	- National Water Quality Laboratory (Burlington)
P&YR	- Pacific and Yukon Region
W&NR	- Western and Northern Region
OR	- Ontario Region
QR	- Quebec Region
AR	- Atlantic Region
N/A	- Not applicable because it is not a research study and was not sent out to Operational Branches
Late	- was not available at the time of mailing to Operational Branches



## INDEXES



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Each project is identified by a three digit study number. The first digit identifies the responsibility centre and the next two digits identify the study.

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- 2 - Environmental Contaminants Division
- 3 - Hydraulics Division
- 4 - Aquatic Ecology Division
- 5 - Aquatic Physics and Systems Division
- 6 - Analytical Methods Division
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* LAM, D.C.L.	502 507
* LAU, Y.L.	343
* LAWRENCE, J.	600
* LEAN, D.R.S.	438 494
* LEE, H.B.	652 653
* LEPPARD, G.G.	436
* LIU, D.	215
* LUM, K.R.	234

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* MACDONALD, H.B.	801 805
* MAGUIRE, R.J.	233

## 1984-85 STUDY PLAN LEADERS

## STUDY LEADER

## STUDY NO

\*\*\*\*\* \*\*\*\*\*  
 \* MANNING, P.G. 428  
 \* MARSALEK, J. 341 342  
 \* MCINNIS, R. 621  
 \* METCALFE, J.L. 223  
 \* MITCHELL, A. 906  
 \* MUDROCH, A. 236  
 \* MURPHY, T. 437  
 \* MURTHY, C.R. 514

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\* NAGEL, W. 571  
 \* NAGY, E. 221  
 \* NAMETH, S.G. 903  
 \* NRIGU, J.O. 412 413  
 \* NRIGU, J.O. & WONG, W.K.T. 405

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\* OLIVER, B.G. 211 213  
 \* ONGLEY, E.D. 170 183  
 \* ONUSKA, F.I. 601  
 \* ONUSKA, F.I. & SCOTT, B.F. 610

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\* PAINTER, S. 477 478 498 910  
 \* PHARO, C.H. 161 164  
 \* PLATFORD, R.F. 241  
 \* PULLEY, H.C. 670

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\* RAE, E. 905  
 \* RAO, S.S. 626 627  
 \* RODGERS, G.K. 101 106 131 140  
 \* ROSA, F. 420  
 \* ROY, F.E. 350 351 355 357  
 \* RUKAVINA, N.A. 322

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\* SCHERTZER, W.M. 509  
 \* SCOTT, B.F. 604  
 \* SEKERKA, I. 603 605 606 611 612  
 \* SEMKIN, R.G. 231  
 \* SIMONS, T.J. 501 503  
 \* SKAFEL, M.G. 321  
 \* SLY, P.G. 109  
 \* SMITH, J.D. 901  
 \* STEWART, D.F. 907  
 \* STOKKER, Y.D. 642  
 \* STRACHAN, W.M.J. 224

1984-85 STUDY PLAN LEADERS

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STUDY LEADER  
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STUDY NO  
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\* TAYLOR, W. B. 802 804 807  
\* THOMPSON, M. E. 506  
\* TSANG, G. 340

-U-

\* VALDMANIS, J. 359  
\* VOLLENWEIDER, R. A. 102

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\* WARWICK, W. 180

DIRECTOR'S OFFICE



## Director's Office

### Introduction

The National Water Research Institute (NWRI) of the Inland Waters Directorate is an environmental research organization at the Canada Centre for Inland Waters (CCIW) in Burlington, Ontario, and is part of the Department of the Environment.

The Institute carries out a program of research and development designed to meet the objective of providing the necessary information and understanding of water systems for water management problems or opportunities in Canada. Building on this program of research and development, it seeks to advance apply and disseminate scientific and engineering knowledge in the field represented by the research programs. The work includes field and laboratory research on problems of natural or man-modified aquatic regimes and contracted research. Problems investigated are of national scope or are related to specific geographical sites referred by other agencies within or from outside the Department of the Environment. Also part of the total program are provision of advice or information through publications, services on a consultative basis to other government agencies, service on scientific and technical committees of the government or government-supported institutions such as the International Joint Commission, and the provision of scientific services such as calibrations, analytical services, instrument testing, methodology documentation or interlaboratory quality control services.

Although the headquarters is at CCIW, detachments of NWRI are located in Winnipeg and Vancouver. The detachments report directly to the IWD Directors of their respective Regions, but receive functional guidance from the Director, NWRI in Burlington. Also, one senior staff member, Dr. P.G. Sly, has been assigned to the Glenora Research Station of the Ontario Ministry of Natural Resources and a small unit working on the Long Range Transport of Airborne Pollutants is based at the GLFRB in Sault Ste. Marie, Ontario. There are many other temporary field sites occupied across Canada as the need arises.

### Senior Scientist

Dr. R.A. Vollenweider, the Institute's Senior Scientist, has continued to assist and advise scientists around the world on eutrophication research problems.

### WHO Collaborating Centre on Surface and Ground Water Quality

In October 1974, the Canada Centre for Inland Waters was designated by the World Health Organization as its Collaborating Centre on Surface and Ground Water Quality (WHO/CC). The main functions of the WHO/CC are (i) coordination of international technical assistance programs to the developing countries; and (ii) representation of Canada's freshwater interests in international forum.

### Science Liaison Office

This office was set up in August 1981 to assist the Director of NWRI in promoting the efficiency, effectiveness and relevance of NWRI's Water Management Research. The office co-ordinates the Institute's multi-disciplinary research program; participation in Environmental Impact Assessments, subventions programs, and committees; and public information.

### Pacific and Yukon Detachment

The Pacific and Yukon Detachment of NWRI conducts research in support of regional water management under the national program Water Management Research. The Branch's work is directed at understanding limnological processes in the unique lakes of the Pacific and Yukon Region, with the ultimate objectives of resolving conflicts of water use, determining the cause of environmental problems, and predicting the ecological response of regional lakes and reservoirs to any of a number of resource developments. Included in the resource development schemes are placer mine outwash, mine tailings dumping, interbasin transfers of water, hydro-electric dam construction and operation, recreational developments and upstream industrial and municipal waste discharges.

Currently the Pacific and Yukon Detachment has three major projects in operation: a joint project with, and partly funded by, Weyerhaeuser Canada to investigate the growth response of river benthic algae to changing nutrient loads, studies of eutrophication and lake restoration or rehabilitation in the more populous southern part of B.C.; and a study of the general limnology of the Yukon River's headwater lakes in northern B.C. and southern Yukon.

### Western and Northern Detachment

This NWRI Detachment was established to serve the research needs of Western and Northern region, a region which extends across the three prairie provinces and the Northwest Territories. The role of NWRI in this Region is to conduct both long-term strategic research for the Department in the general field of water quality management, and short-term tactical research in support of specific operational requirements of a variety of clients.

Historically this group has focussed on practical problems such as mercury contamination of the English-Wabigoon system. More recently it has addressed similar problems in certain Northern Manitoba hydro reservoirs as well as other management concerns such as: restoration issues of the Qu'Appelle River lakes involving eutrophication and toxic substances, the physical processes of nutrient regeneration by bottom resuspension of sediments from selected prairie lakes, and the long distance pathways and ecotoxicology of toxic substances in prairie rivers. Beyond practical problem-solving, this unit provides advice and guidance to IWD in particular and to the Department in general in the planning and execution of water management in western and northern Canada.

## STUDIES FOR THE DIRECTORS OFFICE

SECTION	STUDY	STUDY TITLE	STUDY LEADER	84-05-01.
BRANCH			RODGERS, G.K. BONDY, D.A. DUFFIELD, R.A. RODGERS, G.K. RODGERS, G.K.	
	101	NWRI BRANCH MANAGEMENT		
	115	SCIENCE LIAISON OFFICE		
	130	INFORMATION TECHNOLOGY COMMITTEE		
	131	EMPLOYEE ASSISTANCE PROGRAM		
	140	HANDBOOK ON THE ENVIRONMENTAL IMPACT OF THE CONSTRUCTION OF DAMS		
RESEARCH			VOLLENWEIDER, R.A. RODGERS, G.K. SLY, P.G.	
	102	EUTROPHICATION		
	106	SPECIAL RESEARCH ASSIGNMENTS		
	109	HABITAT STUDIES		
WORLD HEALTH ORGANIZATION	103	COLL. CENTRE ON SURFACE AND GROUND WATER QUALITY	BARABAS, S.	
PACIFIC AND YUKON REGION			PHARO, C.H. GRAY, C.B.J. BOTHWELL, M.L. PHARO, C.H.	
	161	MANAGEMENT AND SCIENTIFIC ADVICE		
	162	SOUTHERN LAKE EUTROPHICATION		
	163	THOMPSON RIVER ALgal ECOLOGY		
	164	NORTHERN HYDRO LIMNOLOGY		
WESTERN AND NORTHERN REGION			ONGLEY, E.D. JACKSON, T. KENNEY, B. WARWICK, M. ONGLEY, E.D.	
	170	PROGRAM MANAGEMENT AND TECHNOLOGY TRANSFER		
	174	MERCURY DYNAMICS IN WESTERN AND NORTHERN LAKES		
	176	PRairie LAKE PHYSICS		
	180	CULTURAL IMPACT ON BENTHIC COMMUNITIES		
	183	NUTRIENT AND CONTAMINANT PATHWAYS IN PRAIRIE RIVERS		







NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-

101

STUDY TITLE TITRE D'ETUDE	NWRI Branch Management			DIVISION NWRI
KEY WORDS MOTS CLEFS	MANAGEMENT, ADMINISTRATION, BUDGET, PLANNING, IJC			SECTION BRANCH
STUDY LEADER/ CHEF D'ETUDE	Rodgers, G.K.		TEL: 637-4625	PAE EAP 1611
TEAM MEMBERS/ MEMBRES D'EQUIPE	M. Stapleton, NWRI Administration & Programs Management Teams, Receptionist			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. Improve effectiveness through IMPAC.
  - a) Develop more quantitative project planning beyond one fiscal year.
  - b) Prepare NWRI input to ECS planning process.
2. To achieve NWRI targets for affirmative action plans.
3. To enhance NWRI's "national" image, provide leadership in water research and anticipate (and research for) future problems.
4. To improve Human Resources Management in NWRI.
5. Improve interaction between operations and research activities.
6. Facilitate new NWRI 'Regions' reporting to Director, NWRI.

Performance Indicators/Indicateurs de rendement

1. a) Long Term Operational Plans.
- b) As required.
2. Targets as defined in HQ memorandum.
3. Completion of NWRI Strategy Plan and meeting of NWRI Management Team - Programs (3-4 times/year). Co-chairman of IJC Council of Great Lakes Research Managers.
4. Formulate complete Training and development program. Review Employee Assistance Program.
5. Continue to respond to the research needs of the Department and IWD Operational Branches and Regions. Research review visit to IWD Quebec and Atlantic regions.
6. Prepare a management process to incorporate line management responsibilities and programs for NWRI W&N and P&Y regions.

Relevance/Objet

To promote efficiency, effectiveness and economy in the management of NWRI's water research and support services.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
102

STUDY TITLE TITRE D'ETUDE	Eutrophication			DIVISION NWRI
KEY WORDS MOTS CLEFS	EUTROPHICATION, LIMNOLOGY, INTERNATIONAL RELATIONS,			SECTION RESRCH
STUDY LEADER/ CHEF D'ETUDE	Vollenweider, R.A.		TEL: 637-4242	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE				FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Haffner, WQB - HQ		TEL: 997-3422	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. Publication of a large comparative study of C, N, P and Chlorophyll in lake, reservoir and marine aquatic environments.
2. Trophic conditions in warm climate reservoirs in relative to temperate lakes.
3. Advice on Eutrophication Issue and phosphorus control study for the GLWQ Program.
4. Advice generally, as consultant for Departmental, national, GEMS/UNEP, WHO, and other concerns that arise.
5. Advice to Director, NWRI on science and research programs of the Institute.

Performance Indicators/Indicateurs de rendement

- 1/2 Complete publications.
3. Participation in Director's Review.
4. Response as agreed and degree of satisfaction of clients.
5. Service to Branch.

Relevance/Objet

Provides Canadian participation and leadership in international activities.  
Provides development of new techniques for addressing the eutrophication issue as it affects lakes and reservoirs.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
103

STUDY TITLE TITRE D'ETUDE	WHO Collaborating Centre on Surface and Ground Water Quality		DIVISION NWRI
KEY WORDS MOTS CLEFS	WATER QUALITY, DATA COLLECTION, DATA QUALITY, GEMS/WATER, GROUNDWATER, INTERNATIONAL RELATIONS,		SECTION WHO/CC
STUDY LEADER/ CHEF D'ETUDE	BARABAS, S.		TEL: 637-4309 PAE EAP 1170
TEAM MEMBERS/ MEMBRES D'EQUIPE	N.J. Clegg, J. Rogalsky, R. Duffield, Water Quality Bulletin Editorial Board		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 01/04/84	FINISH FIN 31/03/85	NWRI WHO
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL: INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. Publication of quarterly journal WATER QUALITY BULLETIN
2. Publication du journal trimestre BULLETIN DE LA QUALITE DES EAUX
3. Arrange visits for foreign visitors to NWRI and consultancies abroad
4. Reviews of manuscripts for (i) monograph on eutrophication, and (ii) wastewater management in industrialized countries.
5. GEMS data bank development, maintenance and reporting.
6. GEMS training and manual documentation.

Performance Indicators/Indicateurs de rendement

1. Volume 9, Numbers 2 (April 84); 3 (July 84); 4 (October 84); and Volume 10, Number 1 (January 85).
2. Volume 9, Nos. 2 (juin 84); 3 (septembre 84); 4 (décembre 84); et Volume 10, No. 1 (mars 85).
3. As required.
4. Late 1984/early 1985.

5/6 Continuing function subject to review of Program by the international committees and the WHO office who serves as the UNEP administrator.

Justification

Canada's commitment to the World Health Organization to assume the responsibilities inherent in the designation of the National Water Research Institute as the WHO Collaborating Centre on Surface and Ground Water Quality. Such responsibilities comprise coordination of international programs aimed at preserving and/or restoring the quality of major surface and ground water bodies.

Canadian commitment, through DOE, to the Global Environmental Monitoring Program (UNEP, GEMS/WATER).

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NO: 84-  
106

STUDY TITLE TITRE D'ETUDE	Special Research Assignments		DIVISION NWRI		
KEY WORDS MOTS CLEFS	REGIONS, SPECIAL PROJECTS		SECTION RESRCH		
STUDY LEADER/ CHEF D'ETUDE	Rodgers, G.K.	TEL: 637-4625	PAE 1516 EAP		
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	Apr. 1981	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL	

Goals/Buts

To provide incidental support for regional programs and for any NWRI deserving new initiatives that arise during the fiscal year.

Performance Indicators/Indicateurs de rendement

Support to regional programs and new initiatives.

Relevance/Objet

To provide support for unanticipated needs without disrupting the allocations already made.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
109

STUDY TITLE TITRE D'ETUDE	Habitat Studies			DIVISION NWRI
KEY WORDS MOTS CLEFS	GREAT LAKES, HABITAT, FISH, REHABILITATION			SECTION RESRCH
STUDY LEADER/ CHEF D'ETUDE	Sly, P.G.	TEL:	476-6556	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	Ontario Ministry of Natural Resources, New York Department of Environmental Conservation			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	Sept. 1983	FINISH FIN	1984
OPERATIONAL CONTACT OPERATIONNEL	T. Moenig, WP&M - HQ			TEL: 997-2639

Goals/Buts

To assess whether or not there is sufficient habitat available to allow lake trout rehabilitation in Lake Ontario, based upon surveys of environmental conditions at selected sites and with reference to other Great Lakes and inland lake locations (See also statements, in detail, from 83-102).

Performance Indicators/Indicateurs de rendement

As per 1983 study plan 109 (Habitat studies) items #1 and 2, deferred to include results of 1983-84 overwinter field work, product in the form of single manuscript (having a number of separate parts), to be completed in draft form by the end of June 1984.

Relevance/Objet

Habitat study in support of Great Lakes rehabilitation; see also: Great Lakes Water Quality Agreement (GLWQA), Great Lakes Fisheries Commission (GLFC) - Great Lakes Environmental Rehabilitation (GLER) and Conference on Lake Trout Research (CLAR) reports, GLFC/Ontario Ministry of Natural Resources (OMNR) - Strategic Plan on Lake Ontario Fisheries (SPOF) report.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 115		
STUDY TITLE TITRE D'ETUDE	Science Liaison Office		DIVISION NWRI		
KEY WORDS MOTS CLEFS	COORDINATION, ADMINISTRATION, PLAN, BUDGET, IJC, GREAT LAKES, PROGRAM DOCUMENTATION		SECTION BRANCH		
STUDY LEADER/ CHEF D'ETUDE	Bondy, D.A.		PAE 1113 EAP		
TEAM MEMBERS/ MEMBRES D'EQUIPE	Receptionist NWRI Management Team		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	Aug. 1981	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL	

#### Goals/Buts

1. Coordinate NWRI Study Planning.
2. Liaise with IWD Headquarters.
3. Liaise with other parts of DOE.
4. Provide scientific secretariat to the Director NWRI.
5. Coordinate the research communication strategy - categorization of IWD water research needs.
6. Respond to special information requests.

#### Performance Indicators/Indicateurs de rendement

1. Complete 1984-85 Study Plans by March 1984 and publish Directory.
2. Coordinate such topics as WRRSP, Unsolicited Proposals, and Post Doctorate Fellowships. Member of IWD Planning Systems Committee and IWD Great Lakes Work Group.
3. Coordinate planning and submission for such topics as GLWQP, EARP, Energy and Environment.
4. Provide support to Director by representing him or preparing papers or background information for IJC, IWD Directors, Regional Directors (Ont.), ECS Directors, etc., meetings and advise Director on policy, research programs and issues. Compile and prepare comprehensive papers and reports on research topics as required by management.
5. Continuous updating of the IWD research needs list. Improvement of the mechanisms to identify needs, their prioritization and subsequent NWRI response/technology transfer. Participation in NWRI Regional Research Review visits.
6. Provide information on scientific programs, serve as contact for scientific enquiries from the public and industry but particularly from other research agencies and arrange special visits to NWRI (in both official languages).

#### Relevance/Objet

To promote efficiency, effectiveness and relevance of NWRI Water Resources Management Research.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan.  
Plan d'étude

NO: 84-  
130

STUDY TITLE TITRE D'ETUDE	Information Technology Committee		DIVISION NWRI
KEY WORDS MOTS CLEFS	TECHNOLOGY, COMPUTER, OFFICE AUTOMATION		SECTION BRANCH
STUDY LEADER/ CHEF D'ETUDE	Duffield, R.A.	TEL: 637-4324	PAE EAP 1620
TEAM MEMBERS/ MEMBRES D'EQUIPE	S. Beal, C. Leacock, and H.C. Pulley		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Farley, WP&M - HQ		TEL: 997-2604
INTEREST/INTERET DIRECT-GENERAL			

Goals/Buts

1. The study leader will serve as the interface between NWRI and and the IWD INFO/TECH Committee.
2. To provide advice to NWRI management with regard to INFO/TECH policy development, computer communications, hardware and software procurement.
3. To facilitate communications between the various components within NWRI and among other units of CCIW.
4. To assist NWRI management towards developing a long-term INFO/TECH plan defining resources required for allocation by management.
5. To review all requests for purchase or rental of computer equipment within NWRI.

Performance Indicators/Indicateurs de rendement

1. A report is to be produced for goals 2 to 4 on the current technologies used in NWRI. The report will provide recommendations to solve current problems and provide direction for the future.
2. Members of the committee will serve on or provide information to the new communication committee that is to provide specifications to GTA regarding the replacement of CCIW's current PBX.

Relevance/Objet

This study is required for future and current planning purposes and coordination with Departmental initiatives in the information technology areas. It will provide for efficient and economical use of technology within NWRI.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
131

STUDY TITLE TITRE D'ETUDE	Employee Assistance Program		DIVISION NWRI
KEY WORDS MOTS CLEFS	HUMAN RESOURCE MANAGEMENT		SECTION BRANCH
STUDY LEADER/ CHEF D'ETUDE	Rodgers, G.K.	TEL: 637-4625	PAE EAP 1670
TEAM MEMBERS/ MEMBRES D'EQUIPE	N. Harper (Referral Agent), DOE Personnel and the DOE/CCIW EAP Committee		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1980	FINISH FIN Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL: INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To maintain referral agent availability for all DOE staff.
2. To maintain the visibility of the program through advertising and supervisor training.

Performance Indicators/Indicateurs de rendement

1. Maintenance of referral agent availability (one in NWRI).
2. Review of Program to be completed by the Committee in light of experience and development in management/union discussion at senior levels (collaboration with DFO - December 1983; DOE Director's agreed on approach; possible collaboration with other Federal government departments - newly organized program fully operational by 1 September).
3. Evidence of its effectiveness - number of consultations, and the percentage of these resolved (quarterly statistics).
4. Degree to which policy requirements are met.
5. NWRI requesting audit prior to new program implementation.

Relevance/Objet

Required under Departmental Policy and Directives on Human Resource Management.

STUDY TITLE TITRE D'ETUDE	Handbook on the Environmental Impact of the Construction of Dams		DIVISION NWRI
KEY WORDS MOTS CLEFS	DAMS, GUIDELINES, RESERVOIRS, DIVERSIONS, ENERGY, DROUGHT		SECTION BRANCH
STUDY LEADER/ CHEF D'ETUDE	Rodgers, G.K.	TEL: 637-4625	PAE EAP 1532
TEAM MEMBERS/ MEMBRES D'EQUIPE	Members of the NWRI Management Team, R. Baxter, D.A. Bondy and P. Hamblin		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Dec. 1983	FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	T. Moenig, WP&M - HQ		TEL: 997-2639
			INTEREST/INTERET <u>DIRECT</u> -GENERAL

#### Goals/Buts

To produce a Handbook on the subject of guidelines for the development of an environmental impact assessment for the construction of major dams by (TBA).

#### Work Plan

1. Preliminary Status Report by December 1983 - completed.
2. Advice on the scope of the project from HQ - placed on hold.
3. Work plan schedule subject to #2 to be documented.

#### Performance Indicators/Indicateurs de rendement

1. Reports submitted on schedule.
2. Reports of appropriate size, quality and relevance.

#### Relevance/Objet

Memorandum dated 83.10.24 to Senior Management Committee from the Deputy Minister concerning a "Meeting with the Minister, Thursday, October 20, 1983": on page 3 of this memorandum there is an instruction to "put together in a readable compendium the extensive work that has been done on this (guidelines for the construction of major dams from an environmental point of view, e.g. James Bay, Slave, Liard) already and bring it to his attention".

This document dated 13 January 1984

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 161
STUDY TITLE TITRE D'ETUDE	Management and Scientific Advice		DIVISION NWRI
KEY WORDS MOTS CLEFS	ADMINISTRATION, MANAGEMENT, REGIONS, B.C., YUKON, LIMNOLOGY, RIVERS, ECOLOGY		SECTION PY/RGN
STUDY LEADER/ CHEF D'ETUDE	Pharo, C.H.		PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	R.J. Daley, C.B. Gray, M. Bothwell, E.C. Carmack		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	IWD
OPERATIONAL CONTACT OPERATIONNEL	Apr. 1984 Ongoing		TEL: 997-3422
D. Haffner, WQB - HQ			INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. Plan, organize, manage, and control the scientific and administrative program of the Pacific and Yukon Region Branch, NWRI, by:
  - a. coordinating the workplan formulation and execution;
  - b. coordinating the strategic and long-term research planning;
  - c. controlling the general administration of the Branch;
  - d. preparing staff appraisal and promotional documents.
2. Provide advice on matters related to limnology and river ecology in the Pacific and Yukon Region to regional management, NWRI-Burlington, and to clients external to IWD.
3. Coordinate the transfer of NWRI P&Y to NWRI-Burl. control, cooperate with NWRI-W&N Reg. on the consolidation of NWRI Western Branches into NHRC, Saskatoon.

#### Performance Indicators/Indicateurs de rendement

1. Successful completion of work plan goals as required.
2. Provision of timely response to EARP and EPS referrals, to technical requests from B.C. MOE, EPS, DFO, CWA studies, and to grant proposals. Undertaking of journal reviews as required.

#### Relevance/Objet

Effective management of the Regional Branch and timely response to requests for referrals and advice is fundamental to the efficient and economic functioning of the Branch and to the successful completion of its programs.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 162		
STUDY TITLE TITRE D'ETUDE	Southern Lake Eutrophication		DIVISION NWRI		
KEY WORDS MOTS CLEFS	EUTROPHICATION, B.C., LAKE, RESTORATION, GOUNDWATER, NUTRIENTS, RESERVOIRS, LIMNOLOGY		SECTION PY/RGN		
STUDY LEADER/ CHEF D'ETUDE	Gray, C.B.J.	TEL: 926-2567	PAE EAP 1514		
TEAM MEMBERS/ MEMBRES D'EQUIPE	E.C. Carmack, R. Daley, C. Pharo, S. Jasper, E. Marles R. Wiegand, R. Kirkland, V. Chamberlain		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	Ongoing	IWD
OPERATIONAL CONTACT OPERATIONNEL	Head, WP&M - P&YR		TEL: 544-6313	INTEREST/INTERET DIRECT-GENERAL	

#### Goals/Buts

1. Publish scientific papers based on past and current Regional Water Management Research studies.
2. Evaluate lime-phosphate precipitation as a cost-effective restoration technique for small, eutrophic lakes in south-central B.C. (in cooperation with NWRI-Burlington)
3. Study the feasibility of nitrogen fertilization as a method for restoring some eutrophic Southern Interior B.C. lakes.
4. Investigate nutrients in the groundwater moving through the Shingle Creek delta (in cooperation with NHRI-HQ, and NWRI-Burlington).

#### Performance Indicators/Indicateurs de rendement

1. Completion of manuscripts on Kamloops and Kootenay Lakes: 2 by 31 October 1984, and 4 by 31 March 1985.
2. Analytical, logistical, and advisory assistance to NWRI-Burlington for field program in Frisken and other lakes and subsequent data interpretation.
3. Written plan for management consideration by Feb. 1, 1985.
4. Data on file by June 30, 1985.

#### Relevance/Objet

Eutrophication is a major problem in some intermontane lakes in B.C.'s southern interior. In some cases the problem is compounded by river impoundments. System-specific information on limnological control factors, diagnoses, and restoration alternatives is essential for effective lake management. Publication of research results is an integral part of RES workplans and PAS.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
163

STUDY TITLE TITRE D'ETUDE	Thompson River Algal Ecology		DIVISION NWRI
KEY WORDS MOTS CLEFS	RIVER ECOLOGY, BENTHOS, ALGAE, EUTROPHICATION, B.C., PHOSPHORUS, BACTERIA		SECTION PY/RGN
STUDY LEADER/ CHEF D'ETUDE	Bothwell, M.L.	TEL: 926-0811	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	S. Jasper, K. Suzuki, M. Bolin, R.J. Daley		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN Ongoing	IWD
OPERATIONAL CONTACT OPERATIONNEL	T.O. Tuominan, WQB - P&YR		TEL: 980-6915
			INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. Publish results of previous phases of Thompson River research.
2. Run 3 or 4 multi-trough experiments to investigate the influence phosphorus concentration on periphyton growth rates and standing crop.
3. Run 2 experiments on diel patterns in  $^{32}P$ -uptake,  $^{14}C$ -uptake and APA.
4. Investigate the influence of UV light on periphyton community growth rates.
5. Investigate relationship between algal productivity and bacterial growth rates.

Performance Indicators/Indicateurs de rendement

1. Technical report on multi-trough research facility. One journal MS submitted by 1 June 1984; another by 1 September 1984.
2. Data reports for each experiment on file by 1 January 1985.
3. Data reports for each experiment on file by 31 March 1985.
4. Data report by 1 January 1985.
5. Preliminary work completed by 1 September 1984; more extensive experiments planned for April 1985. Results on file by 31 July 1985.

Relevance/Objet

River eutrophication is a widespread problem in B.C. Remedial action is hampered by the lack of a method to predict and to quantify algal-growth/phosphorus-supply relationships. This study is supported by a contract with Weyerhaeuser Canada Ltd.

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Study Plan  
Plan d'étude

NO: 84-  
164

STUDY TITLE TITRE D'ETUDE	Northern Hydro Limnology		DIVISION NWRI
KEY WORDS MOTS CLEFS	LIMNOLOGY, SEDIMENTS, ICE, NORTH, NUTRIENTS, ENERGY, YUKON, CLIMATE, CIRCULATION, TEMPERATURE		SECTION P&Y/RGN
STUDY LEADER/ CHEF D'ETUDE	Pharo, C.H.	TEL: 922-6912	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	E.C. Carmack, C.B. Gray, R. Wiegand, R. Kirkland, E. Marles, V. Chamberlain		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN Ongoing	IWD
OPERATIONAL CONTACT OPERATIONNEL	T.J. Day, WRB - HQ		TEL: 997-1185

Goals/Buts

1. Information on riverine circulation and sedimentation as affected by inflow temperature and sediment load.
2. Preliminary data on the compositional and nutrient heterogeneity of suspended sediments in relation to nutrient status of northern lakes.
3. Information on riverine circulation and nutrient utilization under ice in Lake Laberge.
4. Documentation of hydrological, meteorological, and limnological conditions controlling the annual ice cycle in a coupled river-lake system and measurements of under-ice circulation (jointly with NWRI-Burlington, and WRB-P&Y Region).

Performance Indicators/Indicateurs de rendement

1. MS on Kluane Lake sinking plume, from 1982 to 1983 studies complete by October 31, 1984. MS on Laberge buoyant plume by October 31, 1984.
2. Sediment collection method operational by June 1, 1984. Field reconnaissance complete by October 31, 1984; reduced data on file by March 31, 1985.
3. MS complete by 30 November 1985.
4. Data reports on Lake Laberge-Yukon River field program from freeze-up 1983 to spring break-up 1984 on Branch files by 31 October 1984. Continuation of studies as required for winter 1984-85.

Relevance/Objet

Northern B.C. and the Yukon have enormous long-term hydroelectric potential. However, almost nothing is known about the limnology of the large ice-covered lakes of the region. This project is in response to the ECS priority for "research" into the impacts of hydroelectric development in northern areas".

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Study Plan  
Plan d'étude

NO: 84-  
170

STUDY TITLE TITRE D'ETUDE	Program Management and Technology Transfer		DIVISION NWRI
KEY WORDS MOTS CLEFS	MANAGEMENT, TECHNOLOGY TRANSFER, BUDGET		SECTION WN/RGN
STUDY LEADER/ CHEF D'ETUDE	Ongley, E.D.	TEL: 949-5040	PAE EAP 1511
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	IWD
OPERATIONAL CONTACT OPERATIONNEL	D.A. Davis, Regional Director, W&NR		TEL: 359-5319 INTEREST/INTERET <u>DIRECT</u> -GENERAL

#### Goals/Buts

1. Provide leadership in work plan execution, strategic and long-term research planning, branch administration and public information activities.
2. Provide advice and leadership to inter-agency programs, and on application of scientific knowledge to operational concerns.
3. Ensure appropriate facilities planning and input to program planning for the Saskatoon-located NHRC and NWRI-Western Division.

#### Performance Indicators/Indicateurs de rendement

1. Complete LTOP, work planning and resources allocations for the regional NWRI program; control branch budget and carry out personnel functions such as staffing, appraisals, etc.
2. Manage N. Saskatchewan River Basin (Tobin Lake) program on behalf of IWD; conduct periodic reviews of research needs in W&N Region; maintain close liaison with other federal/provincial/territorial agencies; carry out reviews of external studies, research proposals and journal papers, as required.
3. Provide appropriate advice for program planning for the NWRI-Western Division; ensure technical input, as required, for facilities planning for NHRC.

#### Relevance/Objet

To ensure continuity and relevance of NWRI research programs.

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Study Plan  
Plan d'étude

NO: 84-  
174

STUDY TITLE TITRE D'ETUDE	Mercury Dynamics in Western and Northern Lakes		DIVISION NWRI	
KEY WORDS MOTS CLEFS	WATER QUALITY, MANITOBA, SAS., NORTH, PATHWAYS, MERCURY, HEAVY METALS, BIOAVAILABILITY, BIOGEOCHEMISTRY		SECTION WN/RGN	
STUDY LEADER/ CHEF D'ETUDE	Jackson, T.	TEL: 949-5036	PAE EAP 1511	
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Supeene		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT Apr. 1982	FINISH FIN March 1986	IWD CWA	
OPERATIONAL CONTACT OPERATIONNEL	S.W. Sheehan, WQB - P&YR		TEL: 666-6038	INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

Achieve adequate knowledge of mercury sources and cycling, and its effect on aquatic biota in the Qu'Appelle River system and Churchill Diversion, to identify management alternatives as identified under CWA Agreements.

Performance Indicators/Indicateurs de rendement

1. Complete field programs on mercury cycling by August 31, 1984.
2. Complete experimental program on mercury methylation and demethylation by December 31, 1984.
3. Finalize studies of bioaccumulation, pathways and mercury species in South Indian Lake as defined in the Canada-Manitoba Mercury Agreement, and submit final report by March 31, 1985.
4. Complete data analysis on mercury pathways in the Qu'Appelle system and submit one manuscript for publication, by March 31, 1985.

Relevance/Objet

Research identified under the Canada-Manitoba Mercury Agreement and the Qu'Appelle Implementation Agreement. Research also falls into contaminants category identified as Priority (iv) (p. 29 of ECS Strategic Plan - 84/85) and prioritized under Program 1.5 in ECS LTOP Guidelines.

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Study Plan  
Plan d'étude

NO: 84-  
176

STUDY TITLE TITRE D'ETUDE	Prairie Lake Physics		DIVISION NWRI
KEY WORDS MOTS CLEFS	AQUATIC PHYSICS, DATA MANAGEMENT, MODELS, NORTH, ICE, PHYSICAL LIMNOLOGY, PRAIRIES, MANITOBA, SAS.		SECTION WN/RGN
STUDY LEADER/ CHEF D'ETUDE	Kenney, B.	TEL: 949-5034	PAE EAP 1512
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Mollison		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Jan. 1982	FINISH FIN March 1985	IWD
OPERATIONAL CONTACT OPERATIONNEL	D.A. Davis, Region Director, W&NR		TEL: 359-5319
			INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

Complete development and calibration of physical systems theory for chemical response in shallow lakes of prairie and northern locations.

Performance Indicators/Indicateurs de rendement

1. Submit for publication on "predicting eutrophication", by June 30, 1984.
2. Submit for publication the following manuscripts:
  - Sediment resuspension in Lake Manitoba, by May 31, 1984.
  - Phosphorus modeling in Qu'Appelle River Lakes, by June 30, 1984.
  - Under-ice circulation in Long Bay, by Sept. 30, 1984.
  - Two additional papers on nutrient dynamics, by March 31, 1985.

Relevance/Objet

Research required to meet IWD program requirements for water management in prairie locations.

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Study Plan  
Plan d'étude

NO: 84-  
180

STUDY TITLE TITRE D'ETUDE	Cultural Impact on Benthic Communities		DIVISION NWRI	
KEY WORDS MOTS CLEFS	BENTHOS, CONTAMINANTS, NUTRIENTS, TOXICITY, WATER QUALITY, SEDIMENTS, SAS., PALEOLIMNOLOGY		SECTION WN/RGN	
STUDY LEADER/ CHEF D'ETUDE	Warwick, W.	TEL: 949-5038	PAE EAP 1511	
TEAM MEMBERS/ MEMBRES D'EQUIPE	C. Casey		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT Apr. 1982	FINISH FIN March 1986	IWD TCMP	
OPERATIONAL CONTACT OPERATIONNEL	D.A. Davis, Regional Director, W&NR		TEL: 359-5319	INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

To identify and quantify the effect of nutrient and contaminant stress upon benthic organisms living in contemporary and historic sediments of representative stressed lacustrine ecosystems of western Canada, for the purpose of developing practical stress-evaluation techniques.

Performance Indicators/Indicateurs de rendement

1. Complete analysis and submit for publication a report on effect of mercury accumulation on benthic communities by Sept. 30, 1984.
2. Submit for publication paper on antennal deformities of chironomid larvae as a biological screening tool for environmental toxicants, by March 31, 1985.
3. Identify by contract selected components of benthic communities from Qu'Appelle River Lakes, by March 31, 1985.
4. Obtain under contract chemical analyses of lower portion of Pasqua Lake core P/7/M by March 31, 1985.
5. Document incidences of deformities in chironomid larvae from two control sites for the Saskatchewan River Basin study, by March 31, 1985.

Relevance/Objet

In support of toxic contaminants research identified as Priority (iv) (p. 29 of ECS Strategic Plan - 84/85) and prioritized under Program 1.5 in the ECS LTOP Guidelines.

STUDY TITLE TITRE D'ETUDE	Nutrient and Contaminant Pathways in Prairie Rivers		DIVISION NWRI
KEY WORDS MOTS CLEFS	NUTRIENTS, CONTAMINANTS, FLUVIAL GEOMORPHOLOGY, SAS., BIOGEOCHEMISTRY, PATHWAYS, SUSPENDED SOLIDS, SEDIMENTS,		SECTION WN/RGN
STUDY LEADER/ CHEF D'ETUDE	Ongley, E.D.		TEL: 949-5040 PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Supeene, J. Tisdale		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	IWD TCMP
OPERATIONAL CONTACT OPERATIONNEL	D. Gregor, WQB - W&NR		TEL: 359-5321 INTEREST/INTERET <u>DIRECT</u> -GENERAL

#### Goals/Buts

Achieve sufficient resolution of nutrient and contaminant pathways in representative prairie rivers in order to identify improved monitoring strategies and management alternatives.

#### Performance Indicators/Indicateurs de rendement

1. By March 31, 1985, complete data collection and analysis of North Saskatchewan River sample materials using combined assistance of EPS-Edmonton and ECD-CCIW.
2. Write and submit for publication:
  - i) a paper on data collection strategies for water resources assessment by June 30, 1984.
  - ii) one additional paper on current research by March 31, 1985.

#### Relevance/Objet

In support of toxic contaminants research identified as Priority (iv) (p. 29 of ECS Strategic Plan - 84/85) and prioritized under Program 1.5 in the ECS LTOP Guidelines.

# ENVIRONMENTAL CONTAMINANTS DIVISION



## **Environmental Contaminants Division**

The Environmental Contaminants Division investigates in the field and in the laboratory, the pathways, fate and effects of five groupings of contaminants: organic chemicals, toxic metals, organo-metallics, radionuclides.

Research information produced by the Division is valuable in substantiating recommendations for water management actions in polluted river basins. These actions may involve control of effluents, banning of chemicals, guidelines for consumption of biota or water, and many other procedures which can be implemented in Canada. Data may be valuable in negotiations on water quality matters, either interprovincially or internationally. Much of the published information is equally valuable as part of the total input required for toxic chemicals assessments.

### Organics Pathways Section

The objective of this Section is to resolve the entry, fate, distribution, and transfer of organic contaminants in aquatic ecosystems. Research is conducted at specific polluted aquatic ecosystems and in the laboratory. Intercompartmental transfer (water, suspended sediment, sediment, benthic fauna, and flora) and effects of organic contaminants are examined. Atmospheric input of organic contaminants to the aquatic environment is being studied.

### Organics Properties Section

The objective of this Section is to determine the chemical and physical characteristics of toxic substances which govern their effects and pathways in aquatic systems. Field investigations are carried out to determine the distribution of certain contaminants, of contaminant-degrading microorganisms and to identify new contaminants and their sources. In the laboratory, experimental measurements of water/sediment and water/octanol partition coefficients, of bioaccumulation and depuration rates, and of the toxic effects of contaminants, are carried out.

### Inorganics Section

The objective of this section is to determine the persistence and fate of inorganic and organometallic contaminants in aquatic ecosystems.

### Radionuclides Section

The major objective of this Section is to investigate the behaviour of both naturally-occurring and artificially-produced radionuclides in aquatic ecosystems. Studies include the determination of pathways of radionuclides discharged to lakes, the measurement of levels of these radionuclides in water, biota, and sediments, the application of predictive models for the dispersion of radionuclides into surface waters, and the development of methods for the determination of these radionuclides.

### Acid Deposition Section

The objective of research projects conducted by the Acid Deposition Section is to quantify and understand the hydrogeochemical response of acid-sensitive basins to the deposition of air pollutants. Projects utilize the Turkey Lakes Watershed (TLW) as the field study-site to define the most important geochemical mechanisms controlling the "dose-response" relationship for this basin. Study is focused on determining the factors or processes controlling short-term acidification associated with spring snowmelt.

## STUDIES FOR ENVIRONMENTAL CONTAMINANTS DIVISION

SECTION	STUDY	STUDY TITLE	STUDY LEADER
DIVISION	200	ENVIRONMENTAL CONTAMINANTS DIVISION MANAGEMENT & ADMINISTRATION	ALLAN, R. J.
	201	ENVIRONMENTAL CONTAMINANTS DIVISION COMMITTEE INVOLVEMENT	ALLAN, R. J.
	202	MAJOR CAPITAL EQUIPMENT PLAN	ALLAN, R. J.
ORGANICS PROPERTIES	210	STRUCTURE-ACTIVITY CORRELATIONS OF CONTAMINANTS	KAISER, K.L.E.
	211	THE BIOAVAILABILITY OF ORGANIC CONTAMINANTS IN SEDIMENT	OLIVER, B.G.
	212	ORGANIC CONTAMINANTS IN THE GREAT LAKES BASIN	KAISER, K.L.E.
	213	CHLORINATED HYDROCARBONS IN SEDIMENTS AND BIOTA OF THE GREAT LAKES	OLIVER, B.G.
	214	MICROBIAL DEGRADATION OF CHLOROPHENOLS	BAXTER, R.M.
	215	BIODEGRADATION AND TOXICITY ASSESSMENT OF PRIORITY CONTAMINANTS	LIU, D.
	217	TOXICITY AND BIODEGRADABILITY OF ORGANIC CONTAMINANTS BY EUKARYONTS	KWASIEWSKA, K.
ORGANICS PATHWAYS	220	LAKE ONTARIO CONTAMINATION BY PERSISTENT ORGANICS FROM NIAGARA RIVER	FOX, M.E.
	221	PERSISTENCE OF 2,4-D IN NATURAL WATER SYSTEMS	NAGY, E.
	223	ACCUMULATION AND EFFECTS OF CONTAMINANTS IN AQUATIC BIOTA	METCALFE, J.L.
	224	ENVIRONMENTAL DISTRIBUTION OF TOXIC CHEMICALS	STRACHAN, W.M.J.
	225	ACCUMULATION/DEGRADATION OF ORGANIC CONTAMINANTS	CAREY, J.
INORGANICS	230	SPECIATION, CONCENTRATIONS, TOXICITY & PATHWAYS OF ALKYLLAD COMPOUNDS	CHAU, Y.K.
	233	FATE OF ORGANOTINS IN AQUATIC SYSTEMS	MAGUIRE, R.J.
	234	TRACE METAL SPECIATION IN BOTTOM SEDIMENTS OF THE GREAT LAKES	LUM, K.R.
	236	EFFECTS OF SEDIMENT ON METAL DISTRIBUTION AND BIOAVAILABILITY	MUDROCH, A.
ACID DEPOSITION	231	HYDROGEOCHEMICAL RESPONSES OF TURKEY LAKES TO ACID RAIN	SEMKIN, R.G.
	235	GEOCHEMICAL CONTROLS OF AQUATIC SYSTEM RESPONSE TO ACID RAIN	JEFFRIES, D.S.
RADIONUCLIDES	241	RADIUM-226 PATHWAYS - PORT GRANBY WASTE MANAGEMENT SITE TO LAKE ONT.	PLATFORD, R.F.
	242	RADIONUCLIDE PATHWAYS IN THE NIAGARA RIVER AND LAKE ONTARIO	JOSHI, S.R.
	243	AQUATIC PATHWAYS OF RADIONUCLIDES RELEASED BY URANIUM MINING	JOSHI, S.R.

84/05/01.



PROCESSING FORM FOR DIVISION ECO

DATE RUN 84/05/02.

## PROCESSING FORMS FOR DIVISION ECO

DATE RUN 84/05/02.

NO	ORGANIZATION				TECH OPERATIONS				DATA M- ABASE-----EXTERNAL-----				TOTAL				
	PY SAL	OM CAP	PY SAL	OM CAP	PY SAL	CM OVTM	PY SAL	TOTAL AGCY PY SAL	SHADOW PY SAL	OM CAP COST	SHADOW PY SAL	OM CAP	COST				
234	1.50	55	10.0	4.5	--	--	.87	26	3.5	9.0	--	--	5.1				
234											99.3GLWQA	--	--	15.0	5.1	82.5	
234											SHADOW SHIPS	--	--	16.2	9.2		
234											TCMP	--	--			.5	
234											SHADOW TOD	--	--	3.5			
234											FIP	.35	3	--	2.72	93	
234														44.7	18.8	242.6	
236	1.50	59	12.7	55.0	--	--	--	.30	9	5.7	4.0	--	--	141.5GLWQA	--	--	
236											SHADOW SHIPS	--	--	10.0		.8	
236											TCMP	--	--	21.6	10.8		
236											SHADOW TOD	--	--				
241	1.60	62	3.0	--	--	--	--	.05	2	.8	.8	--	--	67.3GLWQA	--	--	
241											SHADOW TOD	--	--	10.0	6.0	.5	
241											FIP	.35	3	--	2.00	67	
242	.90	32	5.0	12.0	--	--	--	.05	2	.5	--	--	--	51.0GLWQA	--	--	
242											SHADOW SHIPS	--	--	10.0	5.0		
242											FIP	.35	3	--	4.0	.95	
243	1.40	59	6.0	3.5	--	--	--	.06	2	2.0	.8	--	--	72.3JCMF	--	--	
243											FIP	.35	3	--	1.81	65	
243											SHADOW SHIPS	--	--	15.0	35.0	126.1	
231	1.30	63	7.0	5.0	.22	8	5.0	--	1.15	35	12.4	8.3	.10	3.138.5LRTP3	.80	27	
231											SHADOW SHIPS	--	--	90.0	10.0		
231											FIP	.70	7	--		1.0	
231											SHADOW TOD	--	--				
231											PARKS	.90	34	--	5.17	186	
231														114.4	15.0	319.4	
235	.50	24	8.0	5.0	.23	10	6.0	--	.30	9	5.5	4.5	--	--	67.6ENV2K1.15	12	9.0
235											LRTP3	.20	7	25.0	10.0		
235											SHADOW TOD	--	--			.5	
235											PARKS	.10	4	--			
235											FIP	.35	3	--	2.83	74	
235														53.5	15.0	142.6	
30.00	1247	295.0	250.0	.69	27	17.5	--	5.40	163	44.8	49.7	.20	2050.8	8.45	157	44.74	
														603.8	265.6	961.1	
															1650	425.3	3301.6

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
200

STUDY TITLE TITRE D'ETUDE	Environmental Contaminants Division Management and Administration		DIVISION ECD	
KEY WORDS MOTS CLEFS	MANAGEMENT, ADMINISTRATION		SECTION ECDDIV	
STUDY LEADER/ CHEF D'ETUDE	Allan, R.J.	TEL: 637-4678	PAE EAP 4100	
TEAM MEMBERS/ MEMBRES D'EQUIPE	E. Kerr, F. Boyd		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

Plan, organize, manage and control the scientific and administrative program of the Environmental Contaminants Division.

Performance Indicators/Indicateurs de rendement

1. Provide secretarial services, administrative services, staff training, conference and program travel, telephone services, equipment and building repairs, publication and journal reprint charges, freight and brokerage costs, photocopier services, stores and word processing services.
2. Coordinate study plan preparation; quarterly written study progress reports; liaison with other federal, provincial, private agencies; and research grant reviews.
3. Prepare staff appraisal and promotion documents.
4. Convene section meetings, other impromptu meetings as required for program development, biennial verbal discussions of projects with project leaders.

Relevance/Objet

To promote efficiency, effectiveness and economy in the Division's projects and administration of A-Base and external funding under GLWQP, LRTAP and TCMP.

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Study Plan  
Plan d'étude

NO: 84-  
201

STUDY TITLE TITRE D'ETUDE	Environmental Contaminants Division Committee Involvement		DIVISION ECD
KEY WORDS MOTS CLEFS	CONTAMINANTS, COMMITTEES		SECTION ECDDIV
STUDY LEADER/ CHEF D'ETUDE	Allan, R.J.	TEL: 637-4678	PAE 4100 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	Division staff as required and approved by Division Chief		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	N/A	TEL:	NWRI INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To act on committees to: a) review study proposals and allocate external funds; b) review data, criteria documents, guidelines and provide advice or prepare integrated reports dealing with environmental contaminants.

Performance Indicators/Indicateurs de rendement

1. Canada/US Niagara River Study - Allan/Mudroch
2. Canada/Ontario English-Wabigoon Mercury Study - Allan
3. GLWQA, Lakes Toxic Contaminant - Allan/Strachan
4. GLWQA, Aquatic Ecosystems Objectives - Strachan
5. DOE/NHW-Toxic Chemicals Committee - Strachan
6. Sweden- ESTHER (Toxic Chemical Assessment) Evaluation - Strachan
7. CCIW Dioxin Working Group - Carey
8. LRTAP Algoma Watershed Steering Committee - Jeffries/Allan
9. ECA Evaluation Committee - Maguire/Strachan
10. AGRAD Working Group on Fate of Oil - Nagy/Scott
11. ASTM Oxygen Uptake Group - Liu
12. Un-FAO Marine Fouling Group - Liu
13. Standards Council of Canada - Chau/Liu
14. IJC - SAB Task Force on Non-phosphate Detergents - Kaiser
15. GLWQP Capital Equipment - Carey
16. CCIW Capital Equipment Replacement - Metcalfe
17. NWRI Management Team - Allan
18. CCIW Library - Scott
19. NWRI Newsletter - Kerr
20. CCIW Safety - Nagy
21. CCIW Cafeteria - Livermore

Relevance/Objet

Technology transfer.

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Study Plan  
Plan d'étude

NO: 84-  
202

STUDY TITLE TITRE D'ETUDE	Major Capital Equipment Plan			DIVISION ECD
KEY WORDS MOTS CLEFS	CAPITAL, EQUIPMENT			SECTION ECDDIV
STUDY LEADER/ CHEF D'ETUDE	Allan, R.J.		TEL: 637-4678	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	Division Staff			FUNDING SOURCE FINANCEMENT NWRI, GLWQA, TCMP
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

See individual studies.

Performance Indicators/Indicateurs de rendement

Major capital items can only be purchased at a Division level. Only rarely are individual studies of a nature which can justify large expenditures for items unique to one investigation.

Relevance/Objet

Economical management of ECD Capital from internal and external funding.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Structure-Activity Correlations of Contaminants		DIVISION ECD
KEY WORDS MOTS CLEFS	TOXIC SUBSTANCES, TOXICITY, STRUCTURE, YEASTS, WORKSHOP, CONTAMINANTS, BACTERIA, FISH		SECTION OPROPS
STUDY LEADER/ CHEF D'ETUDE	Kaiser, K.L.E.	TEL: 637-4244	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	M. Comba, J. Ribo (PDF), in collaboration with D. Liu, K. Kwasniewska, P. Hodson (GLFRB) D.G. Dixon (Univ. of Waterloo)		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1982/83	FINISH FIN 1986/87	NWRI GLWQA, TCMP
OPERATIONAL CONTACT OPERATIONNEL	A. Demayo, WQB - HQ		TEL: 997-1920
			INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. To develop structure-activity correlations for the effects of selected toxic substances in particular para-substituted amines, nitrobenzenes, benzenes and possibly pyridines (1984/85) on selected organisms, such as rainbow trout and Photobacterium ph.
2. To apply such correlations to new compounds and to verify predicted effects by experimental investigations. Such new compounds will combine structural characteristics of previous sets and will be investigated in 1985/86 and 1986/87.
3. To develop a procedural scheme for the prediction of toxic effects of certain classes of compounds in 1986/87.

Performance Indicators/Indicateurs de rendement

1. One paper on QSAR of yeasts by May 1984.
2. One paper on QSAR of nitrobenzenes by June 1984.
3. One paper on QSAR of para-substituted anilines by July 1984.
4. One paper on QSAR of 1,4-disubstituted benzenes by August 1984.
5. Completion of Proceedings of Workshop on QSAR in Environmental Toxicology by April 1984.

Relevance/Objet

Detailed justification has been given in the QSAR research proposal by Kaiser and Hodson (October 1981) and has been recognized by previous funding from GLWQP, TCMP, and IWD sources.

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STUDY TITLE TITRE D'ETUDE	The Bioavailability of Organic Contaminants in Sediment		DIVISION ECD	
KEY WORDS MOTS CLEFS	BIOAVAILABILITY, CONTAMINANTS, SEDIMENTS, ORGANICS, INVERTEBRATES, GREAT LAKES, FATE		SECTION OPROPS	
STUDY LEADER/ CHEF D'ETUDE	Oliver, B.G.	TEL: 637-4604	PAE EAP 4100	
TEAM MEMBERS/ MEMBRES D'EQUIPE	Term Technician		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT 1984/85	FINISH FIN 1985/86	NWRI, TCMP GLWQA	
OPERATIONAL CONTACT OPERATIONNEL	M. Forbes, WQB - HQ		TEL: 997-1921	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. Laboratory experiments on naturally contaminated and spiked sediments to study the desorption of contaminants from sediment into lakewater at various temperatures and to study the biological uptake of pollutants by oligochaete worms from naturally contaminated and spiked sediments of various types.
2. Analysis of field populations of macroinvertebrates and associated sediments to see whether there is any correlations between animal and sediment concentrations.

Performance Indicators/Indicateurs de rendement

1. Predictions of what fraction of the organic pollutants in sediments would be desorbed into the water column when the sediments are resuspended, and what fraction of sediment pollutants are bioavailable.
2. To find out whether or not laboratory results can be applied to the field.

Relevance/Objet

The presence of persistent organic contaminants in Great Lakes sediments is well documented. It is important to find out what portion of this material is readily available to the biological community and what portion has, in effect, been removed from the system by association with the sediments. Input to Toxic Chemicals Fate modeling and GLWQ Agreement. Prior funding from GLWQP and TCMP.

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STUDY TITLE TITRE D'ETUDE	Organic Contaminants in the Great Lakes Basin		DIVISION ECD
KEY WORDS MOTS CLEFS	GREAT LAKES, VOLATILES, CONTAMINANTS, DETROIT RIVER, HAMILTON HARBOUR, FISH, ORGANICS, PATHWAYS, PLUMES		SECTION OPROPS
STUDY LEADER/ CHEF D'ETUDE	Kaiser, K.L.E.	TEL: 637-4244	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	M. Comba		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 82/83	FINISH FIN 86/87	NWRI
OPERATIONAL CONTACT OPERATIONNEL	M. Forbes, WQB - HQ		TEL: 997-1921
			INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. To determine environmental levels of volatile halogenated contaminants in Great Lakes waters, with special emphasis on the Detroit River and Hamilton Harbour.
2. To identify contaminant sources, pathways and sinks.
3. To investigate uptake and deposition rates of volatiles by fish.

Performance Indicators/Indicateurs de rendement

1. One paper on volatile contaminants in the Detroit River by May 1984.
2. One paper on contaminant levels as indicators of river plumes and lake currents by June 1984.
3. One report on volatiles in fish.

Relevance/Objet

Previous results (Kaiser et al., 1983, and Kaiser and Comba, 1983, J. Great Lakes Res. 9(2)) have shown the usefulness of volatile contaminant analyses. This work is extended and applied to other areas.

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STUDY TITLE TITRE D'ETUDE	Chlorinated Hydrocarbons in Sediments and Biota of the Great Lakes			DIVISION ECD
KEY WORDS MOTS CLEFS	TOXIC SUBSTANCES, SEDIMENTS, FISH, GREAT LAKES, PCB's, DISTRIBUTION, MODELS, DATA HISTORICAL			SECTION OPROPS
STUDY LEADER/ CHEF D'ETUDE	Oliver, B.G.		TEL: 637-4604	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Nicol			FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	March 1985
OPERATIONAL CONTACT OPERATIONNEL	K. Kuntz, WQB - OR			TEL: 637-4641 <u>INTEREST/INTERET DIRECT-GENERAL</u>

Goals/Buts

1. Analyses of PCB congeners and other chlorinated hydrocarbons in Lakes Ontario, Erie, Huron and Superior sediments.
2. Correlation of compound distribution with chemical/physical properties of the chemicals.
3. Compound distribution maps for use in identifying sources.
4. Sediment core studies.
5. Analyses of Great Lakes fish and other biota.
6. Laboratory studies on the uptake and excretion of model compounds and common pollutants by fish.

Performance Indicators/Indicateurs de rendement

- Paper on the uptake of halogenated aromatics by rainbow trout by June 1984.
- Paper on the concentrations of chlorinated compounds in Niagara River and Lake Ontario water by September 1984.
- Paper on contaminants in Lake Ontario surface sediments and cores by Dec. 1984.

Relevance/Objet

Compound specific analysis of water, sediments and biota for PCB's and other chlorinated hydrocarbons having a wide range of physical and chemical properties will enable us to develop a better understanding of what factors control environmental distributions. Input to GLWQ Program and Toxic Chemicals Fate Modeling.

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STUDY TITLE TITRE D'ETUDE	Microbial Degradation of Chlorophenols		DIVISION ECD
KEY WORDS MOTS CLEFS	CHLOROPHENOLS, PENTACHLOROPHENOLS, BACTERIA, BIODEGRADATION, MICROBIOLOGY, PERSISTENCE		SECTION OPROPS
STUDY LEADER/ CHEF D'ETUDE	Baxter, R.M.	TEL: 637-4252	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	B.K. Afghan, NWQL		TEL: 637-4661
			INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

To identify the product of the microbial degradation of chlorophenols, especially pentachlorophenol, and elucidate the biochemical reactions involved.

Performance Indicators/Indicateurs de rendement

At least one paper in a major scientific journal on degradation of chlorophenols about December 1984.

Relevance/Objet

Chlorophenols are a TCMP priority chemical, especially pentachlorophenol. They are persistent environmental contaminants. Little is known of the biochemical reactions by which they may be partially or completely degraded. Previous funding from TCMP.

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STUDY TITLE TITRE D'ETUDE	Biodegradation and Toxicity Assessment of Priority Contaminants	DIVISION ECD
KEY WORDS MOTS CLEFS	BIODEGRADATION, TOXICITY, ASSESSMENT, PRIORITY CHEMICAL, CONTAMINANTS, MICROBIOLOGY, BACTERIA	SECTION OPROPS
STUDY LEADER/ CHEF D'ETUDE	Liu, D	TEL: 637-4576
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Thomson, K. Kwasniewska, K. Kaiser	PAE EAP 4100
TIME FRAME CALENDRIER	START DEBUT Apr. 1984 FINISH FIN March 1985	FUNDING SOURCE FINANCEMENT NWRI
OPERATIONAL CONTACT OPERATIONNEL	A.R.Davis, WQB - HQ	TEL: 997-1920
INTEREST/INTERET <u>DIRECT</u> -GENERAL		

Goals/Buts

1. To determine the biodegradability and toxicity of selected priority chemicals, particularly chlorinated phenols, chlorinated benzenes etc., with emphasis on using the chemical mixtures and commercial formulations.
2. To design or modify the biodegradation and toxicity assessment procedures for closing-up the knowledge gap between laboratory study and field observation.
3. To organize the 2nd (1985) International Symposium on Microbial Procedures for Screening Toxicity of Hazardous Chemicals.
4. To initiate a new international journal on chemical toxicity assessment.
5. To provide technical advice to NRC national biotechnology programme on cellulose biodegradation.

Performance Indicators/Indicateurs de rendement

1. One paper on microbial degradation of priority contaminants by October 1984.
2. One paper on bacterial toxicity assessment by December 1984.
3. One paper on biodegradation of chemical with environmental concern by March 1985.

Relevance/Objet

Toxicity and biodegradability are important factors governing the fate and behaviour of organic chemicals in aquatic environments. Thus an increase in our knowledge about the behaviour of the priority compounds in aquatic ecosystems will conserve the effort for effective management of toxic substances in total ecosystem. OECD is a major proponent of the need for laboratory protocol for biodegradability funding from TCMP.

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STUDY TITLE TITRE D'ETUDE	Toxicity and Biodegradability of Organic Contaminants by Eukaryonts	DIVISION ECD	
KEY WORDS MOTS CLEFS	TOXICITY, BIODEGRADATION, CONTAMINANTS, STRUCTURE-ACTIVITY, GREAT LAKES, YEASTS, SEDIMENTS	SECTION OPROPS	
STUDY LEADER/ CHEF D'ETUDE	Kwasniewska, K.	TEL: 637-4576 PAE 4100 EAP	
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Kaiser, D. Liu	FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	M. Forbes, WQB - HQ	TEL: 997-1921	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To apply structure-activity correlations to the effects of selected contaminants (chloro-anilines, chloro-nitrobenzenes, 1,4-disubstituted benzenes, etc.) on yeast or yeast-like fungi (eukaryonts).
1. To determine the abundance of selected yeast and fungi in certain Great Lakes sediments.

Performance Indicators/Indicateurs de rendement

1. One paper on QSAR of yeasts and benzenes, May 1984.
2. One paper on degradation products of halogenated contaminants by November 1984.

Relevance/Objet

Contaminants' effects on and biodegradation by fungi in aquatic systems appear to be important factors governing their distribution and pathways. Both laboratory and field investigations are planned to elucidate the relevant processes.

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STUDY TITLE TITRE D'ETUDE	Lake Ontario Contamination by Persistent Organics from Niagara River		DIVISION ECD
KEY WORDS MOTS CLEFS	ORGANICS, CONTAMINANTS, PERSISTENCE, NIAGARA RIVER, LAKE ONTARIO, FATE, TRANSPORT		SECTION OPATHS
STUDY LEADER/ CHEF D'ETUDE	Fox, M.E.	TEL: 637-4604	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	J.H. Carey, L. Coletta		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1982/83	FINISH FIN 1985/86	NWRI GLWQA
OPERATIONAL CONTACT OPERATIONNEL	K. Kuntz, WQB - OR		TEL: 637-4641
<u>INTEREST/INTERET DIRECT-GENERAL</u>			

Goals/Buts

The transport into Lake Ontario of persistent toxic organic contaminants originating from the Niagara River will be further examined with particular emphasis on the fate of dissolved contaminants which are transported out of the immediate vicinity of Niagara River mouth.

Performance Indicators/Indicateurs de rendement

1. Three sampling cruises of approximately 3 days each using CSS Limnos to follow a sampling grid based on the movements of drogues to be deployed by APSD in May, June and October of 1984. Temperature and optical transmission profiles to be measured at all sites.
2. Sample analyses for specific organo-halogen contaminants unique to Niagara River sources. Fall 1984.
3. Data reduction, analysis and write-up winter 1984.

Relevance/Objet

1982/83 studies have indicated that much of the contaminant load of persistent organics from the Niagara River is transported out of the immediate river mouth area in true solution. The association of this study with complementary APSD studies should help to define the fate of these materials. Niagara River is GLWQ Toxics Program and IJC Priority A area.

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STUDY TITLE TITRE D'ETUDE	Persistence of 2,4-D in Natural Water Systems		DIVISION ECD
KEY WORDS MOTS CLEFS	2,4-D, PERSISTENCE, ACCUMULATION, HERBICIDES, WATER QUALITY, SEDIMENTS, POLLUTANT TRANSPORT, ONTARIO		SECTION OPATHS
STUDY LEADER/ CHEF D'ETUDE	Nagy, E.	TEL: 637-4685	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	S. Painter, J. Hart, J. Wood		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN Apr. 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	G.Y. Kan, WQB - P&YR		TEL: 987-3543
			INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. To determine the occurrence of 2,4-D in Buckhorn Lake water and sediment, on a lake-wide basis, from May to September 1984.
2. To determine possible lake inputs and outputs of 2,4-D from Pigeon and Chemong Lakes, and to Lower Buckhorn Lake, respectively.
3. To correlate seasonal and spatial variations in 2,4-D concentrations with any occurrence of 2,4-D in well waters (to be surveyed by MOE).
4. To conduct a survey on the environmental implications of increased coal utilization in the energy industries.

Performance Indicators/Indicateurs de Rendement

1. Weekly collection of water and sediment samples during June and July, bi-monthly collections in May, August and September, for 2,4-D analysis. Additional samples will be collected for suspended solids and total organic carbon analyses, and current measurements will be made, on each field trip, at the principal points of inflow and outflow (three locations).
2. Analyses to be completed by the end of 1984.
3. Writing of report: December 1984 - March 1985.
4. A feasibility study on environmental implications of coal mining and coal uses in energy generation, coking, gas production and liquefaction will be completed by the end of 1984, a report will be prepared with recommendations on possible concerns and/or future research. Report on possible areas of coal-related research by December 1984.

Relevance/Objet

The Canada-Ontario-Rideau-Trent-Severn Agreement (CORTS) designates Environment Canada as the lead agency for evaluating pesticide effects on water quality in this water system. Buckhorn Lake is a good representation of this system, with intermediate size, depth, and eutrophication level, and with known and documented macrophyte growth and herbicide use for several years.

The results of the 1983 study indicate a 2,4-D persistence in the system greater than previously thought, effective transport mechanism(s), and an unexpected seasonal pattern (high sediment concentrations in May, lower values in September). The proposed lakewide and extended study is designed to indicate the extent and variations of 2,4-D occurrence in the lake, and to show optimum sampling strategies for similar studies elsewhere. Since 2,4-D is a herbicide approved for use in water, and has been used in the past in locations such as the Okanagan Lakes, B.C., our results are of direct relevance to Canadian surface waters.

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STUDY TITLE TITRE D'ETUDE	Accumulation and Effects of Contaminants in Aquatic Biota.	DIVISION ECD
KEY WORDS MOTS CLEFS	TOXIC SUBSTANCES, BIOACCUMULATION, LEECHES, SAS., MOLLUSCS, FISH, DETROIT RIVER, PATHWAYS, FATE	SECTION OPATHS
STUDY LEADER/ CHEF D'ETUDE	Metcalfe, J.L.	TEL: 637-4685 PAE 4100 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	J.H. Carey, M.E. Fox, P.A. Coletta	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1983 FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	T.O. Tuominan, WQB - P&YR	TEL: 980-6915 INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. Continue studies aimed at establishing the potential of leeches as bioindicators of contaminants in freshwater systems by:
  - (a) obtaining field collections of leeches and other sentinel species such as molluscs and crustaceans from several polluted locations (e.g. Canagagigue Creek, Detroit River, North Saskatchewan River) and comparing their bioconcentration potentials for various contaminants.
  - (b) conducting controlled laboratory accumulation and depuration experiments with leeches to determine uptake rates and accumulation plateaus for contaminants with differing properties (e.g. chlorophenols, neutral OCs, organometallics).
2. Continue studies to determine the pathways, accumulation rates, and effects of organic contaminants in fish. Controlled laboratory feeding experiments will be conducted, using rainbow trout and indigenous species such as common shiners and bass, to clarify the routes of entry of contaminants.

Performance Indicators/Indicateurs de rendement

1. (a) Complete field collections by October 1984.  
(b) Conduct experiments during spring and summer of 1984 and prepare report in fall 1984.
2. Conduct experiments during winter 1984 and prepare report by March 1985.

Relevance/Objet

1. Suitable biological indicator organisms are required in order to adequately monitor the levels of environmental contaminants in aquatic ecosystems. Such organisms can be used to assess the bioavailability of contaminants and to identify compounds which are present in the water at undetectable levels.
2. Investigations into the factors and processes controlling the pathways and fate of toxic substances are a high departmental priority.
3. Bioaccumulator use in biomonitoring is a major requirement of WQB in all regions.

STUDY TITLE TITRE D'ETUDE	Environmental Distribution of Toxic Chemicals		DIVISION ECD
KEY WORDS MOTS CLEFS	ECOSYSTEM, MODELS, COMPUTER, RAIN, PRECIPITATION, SEDIMENTS, PARTITIONING, IJC, GREAT LAKES, ORGANICS		SECTION OPATHS
STUDY LEADER/ CHEF D'ETUDE	Strachan, W.M.J.	TEL: 637-4222	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Metcalfe, W.A. Glooschenko		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1983/84	FINISH FIN 1984/85	NWRI GLWQP
OPERATIONAL CONTACT OPERATIONNEL	C.H. Chan, WQB - OR	TEL: 637-4643	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To evaluate methods of predicting the behaviour of persistent organic chemicals in model ecosystems simulating the environment.

Performance Indicators/Indicateurs de Rendement

1. Report on the levels of specified substances in the collected rain samples.
2. Collection and analysis of rain samples from Lake Superior (2 sites), N.B. and Alberta. Report (interal) by FY 1984/85. The previous year's data (Isle Royale and Caribou Is) by June 1984.
3. Possible IJC/SAB sponsored workshop on atmospheric precipitation/indicators for persistent organic chemicals - tentative at present.
4. Report on sediment sorption behaviour for HCB, DDE and two other persistent organic chemicals by September 1984.
5. Report and decision on the further development of model ecosystems.

Relevance/Objet

Predictive, computerized models are theoretically a cost-effective means of estimating the environmental behaviour and concentrations of toxic chemicals. Existing models have not been evaluated in the Canadian context although they should be in a position to do so by the end of FY 1984-85. Such evaluation requires data on proven distributions of such substances in the environment or in a steady-state system which adequately simulates a portion of the ecosystem.

The IJC/SAB and the DOE (Ontario)/GLWQP have identified atmospheric precipitation as a major mechanism for the introduction of some toxic organic substances to the Great Lakes and have called for research on methods and on data development. Earlier efforts under this study have provided some of the methods aspect; data development is the purpose intended for this year both for the IJC and DOE and for the data to test the models on hand. In addition, EPS(HQ)/CCB (Envir. Cont. Act) and the TCMP have identified modeling as a means of evaluating exposure to new toxic chemicals. The DOE (Atlantic) have asked for "wetland" evaluation of toxic chemicals and preliminary discussions indicate a strong interest in the moss/precipitation investigation below. The DOE(W&NR)/IWD (Gummer) have found repeated instances of persistent organic chemicals in the surface waters of that region and it is anticipated that a joint effort to determine the relationship of those residue levels and those in rain will be welcome; this line of cooperation will be investigated. Finally IWD (HQ, Monitoring and Surveys) is expressing some interest in employing the samples outside the Great Lakes region and is considering support of that part of this proposal.

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STUDY TITLE TITRE D'ETUDE	Accumulation/Degradation of Organic Contaminants	DIVISION ECD
KEY WORDS MOTS CLEFS	CONTAMINANTS, DEGRADATION, BIOACCUMULATION, ONTARIO, FLUVIAL SYSTEMS, ORGANICS, PATHWAYS, BENTHOS, SAS.	SECTION OPATHS
STUDY LEADER/ CHEF D'ETUDE	Carey, J.	TEL: 637-4693 PAE 4100 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	M.E. Fox, J. Metcalfe, P.A. Coletta	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1980/81 FINISH FIN 1985/86	NWRI, TCMP, IWD W&NR
OPERATIONAL CONTACT OPERATIONNEL	T.O. Tuominan, WQB - P&YR	TEL: 980-6915 INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

Continue studies of contaminant pathways in river and creek ecosystems by:

1. Finishing Canagagigue Creek project -
  - (a) Further documenting biofilm importance.
  - (b) Finishing benthic invertebrate accumulation study.
  - (c) Finishing benzothiazole study.
  - (d) Summarizing contaminant pathways for rocky bottom streams.
2. Expanding studies of contaminant pathways in other stream types by -
  - (a) Examining water and benthic samples from Qu'Appelle and N. Saskatchewan Rivers, and Fraser Estuary for contaminants, especially chlorophenols.
  - (b) Re-examining the fate of chlorophenols in the Bay of Quinte.

Performance Indicators/Indicateurs de rendement

1. Two publications and two reports by March 1985, several field sampling trips.
2. Preliminary report on (a) by December 1984.

Relevance/Objet

Resolving the pathways of contaminants in real watersheds is a high priority for the Directorate, Service and Department. Previous TCMP funding; chlorophenols is TCMP priority chemical. Prior funding from W&NR, TCMP funding.

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STUDY TITLE TITRE D'ETUDE	Speciation, Concentrations, Toxicity & Pathways of Alkyllead Compounds		DIVISION ECD	
KEY WORDS MOTS CLEFS	SPECIATION, CONCENTRATION, TOXICITY, PATHWAYS, FATE, ALKYLLEAD, GREAT LAKES, DEGRADATION		SECTION INORGs	
STUDY LEADER/ CHEF D'ETUDE	Chau, Y.K.		PAE EAP 4100	
TEAM MEMBERS/ MEMBRES D'EQUIPE	G.A. Bengert, P.T.S. Wong (GLFRB)		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	MARCH 1986	NWRI, TCMP
OPERATIONAL CONTACT OPERATIONNEL	B.K. Afghan, NWQL		TEL: 637-4661	INTEREST/INTERET <u>DIRECT</u> -GENERAL

### Goals/Buts

1. Environmental occurrence of alkyllead compounds will be investigated in areas associated with organolead production (Maitland, Sarnia, Detroit R.) in summer 1984 and 1985.
2. Studies of fate and degradation pathways in the laboratory simulated conditions by December 1984.
3. Studies of uptake and metabolism of alkyllead in fish by October 1985.
4. Studies of structure-toxicity relationship of alkyllead compounds by March 1985.

### Performance Indicators/Indicateurs de rendement

1. Publications on environmental occurrence of organolead in December 1984 and 1985.
2. Publication on fate and degradation pathways by March 1985.
3. Publication on uptake and metabolism of organolead by fish by January 1986.
4. Publication on structure-toxicity relationship of alkyllead compounds by March 1985.

### Relevance/Objet

Since we found alkyllead compounds in fish caught in Maitland, St. Lawrence River area several administrations (EPS, DFO, DOE) have great concern and interests in collecting more data on occurrence and toxicity in order to assess their impact. Prior funding by GLWQP Toxics emergency fund and by TCMP.

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STUDY TITLE TITRE D'ETUDE	Hydrogeochemical Responses of Turkey Lakes to Acid Rain		DIVISION ECD
KEY WORDS MOTS CLEFS	ACID RAIN, GEOCHEMISTRY, LRTAP, IONIC BUDGETS, GROUNDWATER, ACID LAKES		SECTION ACDEPS
STUDY LEADER/ CHEF D'ETUDE	Semkin, R.G.		PAE EAP 4200
TEAM MEMBERS/ MEMBRES D'EQUIPE	D.S. Jeffries, R. Neureuther, M. Jones, J. Longlade		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1980	FINISH FIN 1988	LRTAP NWRI, PARKS
OPERATIONAL CONTACT OPERATIONNEL	D. Haffner, WQB - HQ		TEL: 997-3422
			INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To quantify the hydrogeochemical response of the Turkey Lakes Watershed (TLW) to acidic precipitation using a mass balance approach. The study will focus on determining:

- a) the "dose-response" relationship for the basin, and
- b) the important geochemical mechanisms controlling the relationship.

Quantification will be carried out as follows:

- 1) Continue year-round measurement of hydrological budget
- 2) Continue measurement of precipitation, lake and stream chemistry.
- 3) In cooperation with NHRI, assess the importance of groundwater to the hydrological and chemical budgets of TLW.
- 4) Calculate appropriate budgets from data collected in FY 83/84.
- 5) From the budgets, describe movement of chemical constituents through the various components of TLW.

Performance Indicators/Indicateurs de rendement

1. Report on variability and seasonal patterns in stream composition (May 1984).
2. Data report on lake outflow hydrology (Aug. 1984).
3. Report evaluating lake mass balances (March 1985).

Relevance/Objet

Relevant to an objective established by the LRTAP Steering Committee, to determine the mechanisms which control the response of aquatic ecosystems to long-range transport (deposition) of air pollutants. Funding from LRTAP I program.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
233

STUDY TITLE TITRE D'ETUDE	Fate of Organotins in Aquatic Systems		DIVISION ECD
KEY WORDS MOTS CLEFS	ORGANOTINS, BUTYLTINS, TRIBUTYLTIN, TBTO, OCCURRENCE, BIS(TRI-n-BUTYLTIN) OXIDE, PERSISTENCE, FATE,		SECTION INORGS
STUDY LEADER/ CHEF D'ETUDE	Maguire, R.J.	TEL: 637-4275	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	R.J. Tkacz		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT March 1981	FINISH FIN March 1986	NWRI TCMP
OPERATIONAL CONTACT OPERATIONNEL	G.Y. Kan, WQB - P&YR	TEL: 987-3543	INTEREST/INTERET <u>DIRECT-GENERAL</u>

#### Goals/Buts

1. To determine the persistence and fate of tributyltin in aquatic systems by (a) examining its fate in a mixture of Toronto Harbour water and sediment, and (b) examining its metabolism by rainbow trout.
2. To develop a method of analysis for butyltin species in fish.
3. To complete analyses for preliminary surveys of water and fish of the Great Lakes for butyltin contamination.
4. To start a survey of the occurrence of butyltin species in water and sediment at likely locations (harbours, canals, rivers, other industrial areas) across Canada, with the help of WQB.

#### Performance Indicators/Indicateurs de rendement

##### Reports expected:

1. Fate in Toronto Harbour by September 1984.
2. Metabolism by rainbow trout by October 1984.
3. Results of preliminary study by January 1985.

#### Relevance/Objet

Tributyltin is a very toxic chemical which is used as a slimicide in cooling towers and as an antifouling agent in boat paint. Little is known of its fate in water, although it has been detected at various locations in Ontario. Organotins are on the Environmental Contaminants Act Category III list (information required on occurrence, fate and toxicity). Prior funding from GLWQP and TCMP.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
234

STUDY TITLE TITRE D'ETUDE	Trace Metal Speciation in Bottom Sediments of the Great Lakes		DIVISION ECD
KEY WORDS MOTS CLEFS	TRACE METALS, SPECIATION, SEDIMENTS, GREAT LAKES, TOXIC SUBSTANCES		SECTION INORGCS
STUDY LEADER/ CHEF D'ETUDE	Lum, K.R.	TEL: 637-4617	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	Contract to Ontario Research Foundation for analyses		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1984	FINISH FIN 1986	NWRI, GLWQA TCMP
OPERATIONAL CONTACT OPERATIONNEL	T.L. Tremblay, WQB - P&YR		TEL: 666-6038
<u>Goals/Buts</u>			

To determine the chemical forms of toxic metal ions and other elements of environmental importance in bottom sediments of the deposition zones of Lakes Ontario, Erie, Huron, Georgian Bay and Superior. This study will provide information on the strengths of association and bonding of metal ions to sediments. The results will be useful in assessing the degree to which anthropogenic inputs of metals have elevated the natural lithogenic background, and altered the potential availability of the metals.

Performance Indicators/Indicateurs de rendement

By Fall 1984: Collection of sediment cores from Lakes Ontario, Erie and St. Clair.

Spring 1985: Completion of sample processing and multi-element analysis.

Fall 1985: Collection of sediment cores from Lake Huron, Superior and Georgian Bay. Paper on the chemical forms and speciation of 16 elements in bottom sediments of Lakes Ontario, Erie and St. Clair and the impact of anthropogenic activities on the mobility of these elements at the sediment-water interface.

Spring 1986: Completion of analyses for samples collected in 1985.

Relevance/Objet

The depositional areas of the Great Lakes are the ultimate resting place of a large proportion of the fine-grained sediment on which metallic contaminants are transported. Resuspension of surficial sediment is an important pathway for mobilizing metal ions into the overlying lake waters.

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Study Plan  
Plan d'étude

NO: 84-  
235

STUDY TITLE TITRE D'ETUDE	Geochemical Controls of Aquatic System Response to Acid Rain	DIVISION ECD
KEY WORDS MOTS CLEFS	ACID RAIN, BUFFERING CAPACITY, IONIC BUDGETS, SNOWMELT, CONTAMINANTS, PH, LRTAP, ACID LAKES, GEOCHEMISTRY	SECTION ACDEPS
STUDY LEADER/ CHEF D'ETUDE	Jeffries, D.S.	TEL: 637-4397 PAE 4200 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	R.G. Semkin, M. English (PDF)	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START 1981 DEBUT FIN	1986 LRTAP, PARKS NWRI
OPERATIONAL CONTACT OPERATIONNEL	S. Whitlow, WQB - HQ	TEL: 997-3422 INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

To develop an understanding of the geochemical response of drainage basins and associated lakes to acid precipitation and atmospheric loading of other contaminants. Investigation will focus on delineating the important factors controlling both long and short-term acidification of basin by carrying out the following:

- 1) Investigate the influence of acidic deposition on the material budgets of the Turkey Lakes Watershed. Deviations from the normal will yield information on the factors controlling the degree and rate of acidification in the long term.
- 2) Investigate factors controlling short term acidification. Work on assessment of snowpack storage and release of acids will be intensified as will investigation of variation in stream and lake pH during spring melt.
- 3) Investigate temporal and spatial variations in the concentration and speciation of aluminum in headwater streams and Batchawana Lake in the Turkey Lake Watershed. Variability will be related to hydrological conditions and potential toxicity will be evaluated in cooperation with J. Kelso (GLFRB).

Performance Indicators/Indicateurs de rendement

1. Report on the importance of the input of materials to lakes during snowmelt relative to annual budgets (Dec. 1984).
2. Report on within snowpack movement of contaminants during melt (Feb. 1985).

Relevance/Objet

Long-range transport of atmospheric pollutants is causing acidic deposition to occur in much of southern Ontario, Quebec and the Maritime Provinces. The rate of acidification of the receiving surface waters is poorly understood. Long and short term acidification can be expected to affect aquatic biota in different ways. Funding from LRTAP I program.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
236

STUDY TITLE TITRE D'ETUDE	Effects of Sediment on Metal Distribution and Bioavailability		DIVISION ECD		
KEY WORDS MOTS CLEFS	METALS, SEDIMENTS, MARITIME PROVINCES, BIOAVAILABILITY, DREDGING, GEOCHEMISTRY, GREAT LAKES, HARBOURS		SECTION INORG		
STUDY LEADER/ CHEF D'ETUDE	Mudroch, A.	TEL: 637-4707	PAE EAP 4100		
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Metcalfe, E. Kokotich		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	MARCH 1986	NWRI GLWQA
OPERATIONAL CONTACT OPERATIONNEL	K. Kuntz, WQB - OR T. Clair, WQB - AR		TEL: 637-4641 388-6606	INTEREST/INTERET DIRECT-GENERAL	

Goals/Buts

1. Determination of particle size and geochemical composition effects on distribution of toxic metals in sediment collected from selected localities in Canada, chosen to represent various sources of contaminants (mining activities, disposal of waste, leakage from dump sites, contaminated sediment in harbours).
2. Determination of mechanism of association of metals with sediment particles in individual size fractions and their availability to benthic organisms and plankton.

Performance Indicators/Indicateurs de rendement

1. Report and/or paper on metal concentrations in sediment size fractions by September 1984.
2. Report and/or paper on metal association with various sediment components by March 1985.
3. Report and/or paper on the role of benthic organism on distribution acid availability of metals in sediment by March 1985.

Relevance/Objet

Relevant to DOE objective (B), ECS sub-objective (4) and for AEOC report recommendations (1982); also relevant to GLWQA (1978) Annex 7: Dredging; and to Fisheries and Oceans, Small Craft Harbours. Funding from GLWQA Dredging element, and from Small Craft Harbours, Ontario Region; support from IWD-Atlantic Region and N.S. DOE. Study results are of interest to Environmental Design Division of EPS, Ontario Region, Toronto.

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Plan d'étude

NO: 84-  
241

STUDY TITLE TITRE D'ETUDE	Radium-226 Pathways - Port Granby Waste Management Site to Lake Ontario	DIVISION ECD
KEY WORDS MOTS CLEFS	RADIOACTIVITY, WASTE MANAGEMENT, GROUNDWATER, LAKE ONTARIO, SEDIMENTS, PATHWAYS	SECTION RANUCS
STUDY LEADER/ CHEF D'ETUDE	Platford, R.F.	TEL: 637-4252 PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.G. Bobba, J. Fitzgerald, S.R. Joshi	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1977	FINISH FIN March 1985
OPERATIONAL CONTACT OPERATIONNEL	W. Bien, WP&M - OR	TEL: 997-4321 INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. To continue transport studies of radium, uranium and nitrate flowing from the Eldorado Waste Management Site (at Port Granby) into Lake Ontario.
2. To sample water and sediments in the beach area near the site in an effort to locate the permeable layer through which flow takes place.
3. Preliminary dye tracer studies and complete general surveillance.

Performance Indicators/Indicateurs de rendement

1. Plot concentration contours for each field trip.
2. Produce report by end of March 1984 on results obtained from 1981-1983.

Relevance/Objet

Check on potential radioactivity hazard to public. Funding from GLWQP Toxics Element; funding in part from EPS. Initiated at the request of AECB.

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NO: 84-  
242

STUDY TITLE TITRE D'ETUDE	Radionuclide Pathways in the Niagara River and Lake Ontario		DIVISION ECD		
KEY WORDS MOTS CLEFS	SEDIMENT, RADIOACTIVITY, NIAGARA RIVER, LAKE ONTARIO, PATHWAYS		SECTION RANUCS		
STUDY LEADER/ CHEF D'ETUDE	Joshi, S.R.	TEL: 637-4573	PAE EAP 4100		
TEAM MEMBERS/ MEMBRES D'EQUIPE	S.P. Thompson		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	1981-82	FINISH FIN	1984-85	NWRI GLWQA
OPERATIONAL CONTACT OPERATIONNEL	M. Forbes, WQB - HQ		TEL: 997-1921	INTEREST/INTERET <u>DIRECT-GENERAL</u>	

Goals/Buts

1. Complete the analyses of sediment samples for various alpha-emitting radionuclides.
2. Determine the inputs of radionuclides to Lake Ontario.

Performance Indicators/Indicateurs de rendement

1. Report analytical procedures by June 1984 and final results by March 1985.
2. Write a review article discussing the occurrence of radioactive materials in the Great Lakes, by March 1985.

Relevance/Objet

The Canadian and U.S. federal governments, as well as those of Ontario and New York, have identified pollution of the Niagara River as a major cause for concern. Plutonium and, possibly, some other radionuclides, are expected to be found as a result of earlier nuclear fuel reprocessing effluents from West Valley, N.Y., entering the eastern end of Lake Erie. Prior funding from GLWP Toxics element.

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NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Aquatic Pathways of Radionuclides Released by Uranium Mining	DIVISION ECD
KEY WORDS MOTS CLEFS	RADIOACTIVITY, LAKE, SAS., PATHWAYS, FISH, ENERGY	SECTION RANUCS
STUDY LEADER/ CHEF D'ETUDE	Joshi, S.R.	TEL: 637-4573 PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	R.F. Platford, S.P. Thompson	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1983	FINISH FIN 1988
OPERATIONAL CONTACT OPERATIONNEL	B.K. Afghan, NWQL	TEL: 637-4661 NWRI TCMP INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. Determine concentrations of Uranium and its daughter products in cores, water and fish samples taken from Langley Bay/Lake Athabasca.
2. Sample new locations in northern Saskatchewan.

Performance Indicators/Indicateurs de rendement

1. Report giving preliminary assessment of transport of uranium daughter products from tailings to Langley Bay and Lake Athabasca.

Relevance/Objet

The study bears relevance to DOE priorities in the Energy Sector as outlined in the Departmental Strategic Plan. It is expected that the study will provide information on the presence of radiologically toxic elements in the aquatic environment as well as a knowledge of their actual and potential impact. Funding in past from EPS, Edmonton.

## HYDRAULICS DIVISION



## Hydraulics Division

The Hydraulics Division has five mandates.

The first is to undertake research into all aspects of the hydraulics of inland waters. This includes research and model development for physical processes and phenomena in lakes, rivers, and reservoirs, including geophysical processes and ice.

The maintenance and calibration of current meters and sediment samplers is the second mandate in collaboration with the Water Resources Branch.

The third mandate is to provide a drafting service which produces diagrams, figures, and illustrations for scientific publications as well as slides and material for verbal presentations.

Engineering expertise is applied to the development of systems and methods to measure environmental variables in the field or laboratory, as well as the development and improvement of equipment to obtain samples of water or sediment. This fourth mandate provides support to all scientific divisions in the Institute and occasionally to others.

Lastly, the fifth mandate is to ensure that scientific equipment is repaired and calibrated according to standard procedures. In addition, prototypes of equipment and sensors are also designed and manufactured. This technical service supports all Institute Divisions and occasionally others.



## STUDIES FOR HYDRAULICS DIVISION

SECTION	STUDY	STUDY TITLE	STUDY LEADER	84/05/01.
DIVISION	310	DIVISION MANAGEMENT	DICK, T.M.	
	315	CAPITAL PLAN	DICK, T.M.	
	318	APPLIED RESEARCH AND ENGINEERING STUDIES	DICK, T.M.	
SHORE PROCESSES	320	AIR-WATER INTERACTION	DONELAN, M.A.	
	321	LITTORAL ZONE APPLIED STUDIES	SKAFEL, M.G.	
	322	LITTORAL SEDIMENTOLOGY AND GEOTECHNIQUE	RUKAVINA, N.A.	
TECHNICAL SERVICES	330	HYDRAULICS/GEOTECHNICAL LABORATORY SERVICES	DEZEEUW, C.-	
	331	NATIONAL CALIBRATION SERVICE	DEZEEUW, C.-	
ENVIRONMENTAL HYDRAULICS	340	FRAZIL ICE IN RIVERS	TSANG, G.	
	341	WATER QUALITY AND QUANTITY IN URBAN RUNOFF	MARSALEK, J.	
	342	WATERFORD RIVER BASIN - NEWFOUNDLAND	MARSALEK, J.	
	343	RIVER FLOWS WITH MOBILE BEDS	LAU, Y.L.	
	344	SUSPENDED SEDIMENTS AND BED LOAD MEASUREMENT	ENGEL, P.	
	345	ICE JAMS AND FLOODS	BELTAOS, S.	
ENGINEERING SERVICES	350	ENGINEERING SERVICES SECTION OPERATIONS	ROY, F.E.	
	351	ENGINEERING SUPPORT TO NON-NWRI RESEARCH STUDIES	ROY, F.E.	
	352	FRAZIL ICE RECORDER	FORD, J.S.	
	353	CYTOMETRIC ALGAE RECORDING PROJECT-AUTOMATED ALGAE & BACTERIA COUNTING	DESROSIERS, R.	
	354	NWRI PROGRAM FOR INDUSTRY LABORATORY PROJECT (PILP)	FORD, J.S.	
	355	COMPUTER-AIDED DESIGN SYSTEM DEVELOPMENT	ROY, F.E.	
	356	NEW GENERATION DATA LOGGER - PILOT RUN	FORD, J.S.	
	357	SAMPLING TECHNIQUES IMPROVEMENTS NEAR BOTTOM	ROY, F.E.	
	358	ICAP EXTENSIONS	DESROSIERS, R.	
	359	BENTHIC BOUNDARY ARRAY	VALDMANIS, J.	
MANUFACTURING AND TECHNICAL DEVELOPMENT	360	SUPPORT TO NWRI STUDIES	BAIRD, S.D.	
	361	SUPPORT TO NON-NWRI STUDIES	BAIRD, S.D.	
	362	INSTRUMENTATION CALIBRATION STANDARDS	BAIRD, S.D.	
	363	COMMON USER TEST EQUIPMENT AND MATERIELS STORES	BAIRD, S.D.	
	365	INSTITUTE EQUIPMENT MAINTENANCE AND MANUFACTURING	BAIRD, S.D.	
OFFICE SERVICES	370	OFFICE SUPPORT SERVICES	HAWKINS, M.	
DRAFTING	380	DRAFTING SERVICES TO CCIW	FINN, W.D.	



## PROCESSING FORM B FOR DIVISION HD

DATE RUN 84/05/02.

ORGANIZATION		ENG/MANTEC		TECH OPERATIONS		DATA M		ABASE		EXTERNAL		SHADOW		TOTAL			
NO	PY SAL	OM	CAP	PY SAL	OM	CAP	PY SAL	OM	DVTM	PY SAL	TOTAL	AGCY	PY SAL	OM	CAP COST		
310	1.00	46	35.0	--	--	--	--	--	--	.91.0	--	--	--	1.00	46	35.0	
315	.50	23	--	--	--	--	--	--	--	23.0	--	--	--	.50	23	--	
318	.50	23	85.0	--	--	--	--	--	--	108.0	--	--	--	.50	23	85.0	
320	1.00	49	30.0	18.0	--	--	--	--	--	.40	13	110.2	--	--	1.40	62	30.0
321	1.90	94	10.1	--	--	--	--	--	--	.30	9	4.0	.20	7	123.8	SCH	
321										SHADOW	TOD	1.00	30	--	1.8		
321										ENERG	--	--	46.0	5.0	3.40	143	60.1
322	3.10	153	5.9	10.0	--	--	--	.40	12	3.0	1.0	--	--	.5	3.85	170	
322										SHADOW	TOD	.35	4	--			189.5
33014.00	485	31.5	37.0	.58	21	6.4	--	--	--	--	--	--	--	--	14.58	506	37.9
331	3.00	95	10.0	7.0	--	--	--	--	--	.10	3	116.3	--	--	3.10	99	10.0
340	1.00	52	17.0	36.0	.17	6	2.5	--	.10	3	2.0	--	--	--	1.27	61	21.5
341	1.20	63	3.6	3.5	--	--	--	--	--	--	--	--	--	--	70.1	TCMP	
341										SHADOW	TOD	--	37.0	--	1.0		
341										MTC	--	8.0	--				
341										APWA	--	21.0	--				
341										UNESC	--	2.5	--				
342	.80	42	3.4	--	--	--	--	--	--	45.4	--	--	--	--	.80	42	3.4
343	2.40	125	11.0	12.5	--	--	--	--	--	148.5	FIP	.35	3	--	2.75	128	11.0
344	.60	31	3.0	--	.47	21	13.0	15.0	--	--	--	.83.0	--	--	1.07	52	16.0
345	2.00	105	12.0	--	--	--	--	--	.40	12	4.0	1.5	--	--	1.5	2.40	119
345										SHADOW	TOD	--	--	--			136.1
350	.82	23	11.0	--	.52	14	--	--	--	--	--	48.0	--	--	1.34	37	11.0
352	.30	8	9.3	--	.37	10	--	--	.10	3	1.5	.2	--	--	.3	.77	21
353	.20	6	3.0	--	.01	0	--	--	.05	2	1.0	--	--	--	.1	.26	8
353										SHADOW	TOD	--	--	--			4.0
354	.20	6	--	--	--	--	--	--	--	6.0	--	--	--	--	.20	6	--
355	.14	4	--	--	--	--	--	--	--	--	--	4.0	--	--	.14	4	--
356	.35	10	2.2	20.5	.33	9	--	--	--	--	--	--	--	--	.68	19	2.2
357	.15	4	4.0	3.0	.24	7	--	--	--	--	--	18.0	--	--	.39	11	4.0

**PROCESSING FORM FOR DIVISION HD**

DATE RUN 84/05/02.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 310
STUDY TITLE TITRE D'ETUDE	DIVISION MANAGEMENT		DIVISION HD
KEY WORDS MOTS CLEFS	TRAINING, DEVELOPMENT, FINANCE, PLAN, CONTROL		SECTION HDDIV
STUDY LEADER/ CHEF D'ETUDE	Dick, T. M.		TEL: 637-4738 PAE 1513 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	Administrative Officer, Section Heads		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI Cost. Recov.
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL: INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To provide planning, direction, coordination and control of scientific and service projects.
2. Planning and control of resources.
3. Human Resource Management.

Performance Indicators/Indicateurs de rendement

1. 1.1 Long Term and Work Plans of good quality produced on schedule; 1.2 Preparation of quarterly reports for Division operations system and the NWRI Work Plan; 1.3 Internal Division and NWRI support cost controls; 1.4 Program coordination activities; 1.5 Contribution to Branch management; 1.6 Plan for Technology Transfer; 1.7 Plan for Program Evaluation.
2. 2.1 PY and dollar budget control with early advice to Director of significant variances; 2.2 Preparation of financial plans.
3. 3.1 Attention to safety, health and security programs; 3.2 Accurate and timely employee assessments; 3.3 Training and development programs; 3.4 Training and redeployment plan; 3.5 Regular staff communications.

Relevance/Objet

Expenditures for research, development, and training should be directed towards established objectives of the Department and the Institute.

NATIONAL WATER RESEARCH INSTITUTE  
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Plan d'étude

NO: 84-  
315

STUDY TITLE TITRE D'ETUDE	Capital Plan		DIVISION HD
KEY WORDS MOTS CLEFS	PLANNING, PROGRAMS, FINANCE		SECTION HDDIV
STUDY LEADER/ CHEF D'ETUDE	Dick, T. M.	TEL: 637-4738	PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	Section Heads, Administrative Officer		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	N/A	TEL:	NWRI INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To ensure that the acquisition and replacement of obsolete equipment is placed in a rational plan.

Performance Indicators/Indicateurs de rendement

Capital acquisition plan is organized to meet forecasted obsolescence and program needs.

Relevance/Objet

Money must be invested carefully for up-to-date equipment in order to ensure staff productivity and effective science at the forefront of technology.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 318	
STUDY TITLE TITRE D'ETUDE	Applied Research and Engineering Studies		DIVISION HD	
KEY WORDS MOTS CLEFS	DEVELOPMENT, TECHNOLOGY		SECTION HDDIV	
STUDY LEADER/ CHEF D'ETUDE	Dick, T. M.	TEL: 637-4738	PAE EAP 1532	
TEAM MEMBERS/ MEMBRES D'EQUIPE	Divisional Staff		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL
<u>Goals/Buts</u>				
<ol style="list-style-type: none"> <li>1. To provide highly specialized equipment to industry, provincial agencies and other Federal departments.</li> <li>2. To provide and apply engineering and scientific expertise to specific problems.</li> </ol>				
<u>Performance Indicators/Indicateurs de rendement</u>				
<ol style="list-style-type: none"> <li>1. Funds recovered from clients exceed expenditures.</li> </ol>				
<u>Relevance/Objet</u>				
<p>The laboratories represent an investment in highly specialized facilities and staff which are conditionally made available to the private sector and other agencies in order to promote Canadian expertise and developments.</p>				

NATIONAL WATER RESEARCH INSTITUTE  
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Plan d'étude

NO: 84-  
320

STUDY TITLE TITRE D'ETUDE	Air-Water Interaction	DIVISION HD
KEY WORDS MOTS CLEFS	AIR-WATER INTERACTION, WAVES, TURBULENCE, MODELS, SHEAR STRESS, LAKE	SECTION SHORES
STUDY LEADER/ CHEF D'ETUDE	Donelan, M.A.	TEL: 637-4231 PAE 1513 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984 FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	A. Ellis, WP&M - HQ	TEL: 997-1461 INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To obtain, discover or develop theories and/or models to describe and predict the interaction of wind and water, including surface waves, roughness of interface, fluxes of mass and energy, turbulence, and wave-generated mixing.

Performance Indicators/Indicateurs de rendement

1. Complete analysis of preliminary field data of waves and turbulent fluctuations by March 31, 1985. Design full field experiment of wave-turbulent interactions by March 1985.
2. Complete the analysis of instantaneous velocity profiles over wind-generated waves obtained in the wind-wave flume by March 1985
3. Develop "Donelan's" model for wave prediction in "shallow" water, also with application to resuspension of bottom sediments, by 1985.
4. Provide a theory or model for the estimation of wind drag on the water surface, and wave statistics by March, 1985.

Relevance/Objet

Circulation and mixing in lakes are primarily driven by wind. Waves are important energy sources for all nearshore actions on bottom sediment and internal lake mixing. Fluxes of mass and heat are important factors in assessing environmental factors such as evaporation, heat balance, micro climates and thermocline development.

Assessment of water temperatures and depth of the epilimnion in proposed reservoirs depends on knowing the air-water surface interaction. Energy developments and floods by waves and surges need precise information and prediction for efficient and effective design and management.

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STUDY TITLE TITRE D'ETUDE	Littoral Zone Applied Studies		DIVISION HD
KEY WORDS MOTS CLEFS	WAVES, EROSION, HARBOURS, TECHNOLOGY TRANSFER, MARITIME PROVINCES		SECTION SHORES
STUDY LEADER/ CHEF D'ETUDE	Skafel, M.G.	TEL: 637-4736	PAE EAP 1513
TEAM MEMBERS/ MEMBRES D'EQUIPE	C. Bishop, P. Hamblin		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984	FINISH FIN March 1985	NWRI, PERD, SCH, & Cost Rec.
OPERATIONAL CONTACT OPERATIONNEL	E.R. Langley, WP&M - AR	TEL: 426-3266	INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

To develop methods and theories to permit prediction of littoral zone changes including environmental assessments and to address specific environmental and developmental requirements of clients in the public and private sectors.

Performance Indicators/Indicateurs de rendement

1. Final edition of manual which provides efficient exploitation and recycling of vehicle tires as floating breakwaters by March 1985.
2. Completion of wave statistics and direction for joint studies on coastal instrumentation sponsored by NRC in Pt. Sapin, New Brunswick, and Prince Edward Island.
3. Continuation of study on artificial islands on behalf of the Panel on Energy Research and Development.
4. Provision of advice and model study tests of facilities for the implementation of environmentally compatible facilities required by the Small Craft Harbours Branch.
5. Studies of sedimentation and erosion and water level prediction for the Ministry of Transport in the St. Lawrence System.
6. Development of guidelines to analyze or determine water levels with concomitant probabilities when tides, storm surges and waves are present.

Relevance/Objet

Heritage lands, national parks, and other valuable lands require policies and practices to resist changes in shore regime caused by developments or by change. Environmental Impact Assessment requires that changes in the littoral zone be described quantitatively. Similar requirements are necessary for assessment of applications for development under the Navigable Waters Protection Act. Costs incurred to mitigate loss of historically or culturally important lands should be efficient, environmentally compatible, and aesthetically acceptable.

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STUDY TITLE TITRE D'ETUDE	Littoral Sedimentology and Geotechnique	DIVISION HD
KEY WORDS MOTS CLEFS	LITTORAL ZONE, EROSION, SEDIMENTS, SHORELINE, BED FORMS	SECTION SHORES
STUDY LEADER/ CHEF D'ETUDE	Rukavina, N.A.	TEL: 637-4247 PAE EAP 1513
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Coakley, A. Zeman, M. Skafel	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984 FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	K. Wiebe, WRB - HQ	TEL: 977-1934 INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. To survey, interpret and record the occurrence and distribution of sediments and strata in support of environmental studies, and to evaluate developments.
2. To investigate the controlling variables for the erosion of cohesive soils and the recession of shores, and obtain quantitative relationships suitable for prediction models.
3. To undertake and document morphological changes in shorelines and the impacts on planning of nearshore and contingent land areas.

#### Performance Indicators/Indicateurs de rendement

1. Complete the documentation of sedimentological nearshore data for Lake Erie and Lake Huron by March 1985
2. Complete and present a concluding report on the geological factors controlling the evolution of Lake Erie North Shore by December 1984.
3. Prepare a concluding report of the changes in the test beach at Burlington bar to provide quantitative input to the development of a predictive model by March 1985.
4. Publish data and analysis of erosion rates obtained for Port Burwell litigation by September 1984.
5. Prepare plan of action for survey of nearshore deposits in Lake Superior.
6. Prepare a report on the measurement of erodibility and the natural variations of field samples.

#### Relevance/Objet

Nearshore development projects such as pipelines, marinas, water intakes, outfalls, require basic data for assessment.

Possible diversion of Great Lakes basin waters and increasing consumptive use will affect the regime of nearshore zones. Assessments of the impact of water level changes of any lake or reservoir requires a model or theory to predict effects on the erodible shores.

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STUDY TITLE TITRE D'ETUDE	Hydraulics/Geotechnical Laboratory Services		DIVISION HD		
KEY WORDS MOTS CLEFS	SEDIMENTS, SUPPORT, HYDRAULICS		SECTION TCSRVS		
STUDY LEADER/ CHEF D'ETUDE	DeZeeuw, C.	TEL: 637-4733	PAE EAP 1513		
TEAM MEMBERS/ MEMBRES D'EQUIPE	G. Duncan, G. Voros, K. Salisbury, E. Nash, R. Klainka, J. Dalton		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	1981	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	C.P. Robinson, WRB - P&YR		TEL: 666-3858	INTEREST/INTERET <u>DIRECT</u> -GENERAL	

Goals/Buts

To provide expert technical support staff and fully operational laboratories and equipment for hydraulic and geotechnical research and related activities.

To provide for a safe working environment and safe practices.

Performance Indicators/Indicateurs de rendement

Staff performance will be reviewed regularly and reported on quarterly.

A quarterly report on laboratory equipment acquisitions, repairs, and replacements will be prepared and reviewed.

Regular reports and actions taken on Safety Committee recommendations.

Relevance/Objet

Overall efficiency and the effectiveness of the Division as well as other divisions supported by Technical Services, depends on a cohesive, expert section which also maintains and develops laboratory equipment and facilities.

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NO: 84- 331

STUDY TITLE TITRE D'ETUDE	National Calibration Service		DIVISION HD
KEY WORDS MOTS CLEFS	OPEN CHANNEL FLOW, STREAMS, NATIONAL STANDARDS, RIVERS, CALIBRATION, CURRENT METER		SECTION TCSRVS
STUDY LEADER/ CHEF D'ETUDE	DeZeeuw, C.	TEL: 637-4733	PAE EAP 1430
TEAM MEMBERS/ MEMBRES D'EQUIPE	D.Fekyt, C. Bil, B. Near, P. Engel (Consultant).		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1981	FINISH FIN Ongoing	NWRI Cost. Recov.
OPERATIONAL CONTACT OPERATIONNEL	Y. Durette, WRB - HQ	TEL: 997-1185	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

Calibration and performance testing of water current meters, sediment measuring apparatus, and other hydrometric equipment used for data collection purposes.

Performance Indicators/Indicateurs de rendement

1. Responsive and prompt attention is required for all requests for work or information.
2. Quarterly reports are required summarizing the work accomplished, including client's names, as well as receipt and completion dates of jobs.
3. Feed back from clients such as Water Survey of Canada.

Relevance/Objet

To ensure that current meter systems and flow measuring systems measure correctly and to a known precision.

Assessment of water resources or evaluation of theories to predict flow of water, movement of sediment, or pressure gradients requires instruments of known performance and calibration.

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STUDY TITLE TITRE D'ETUDE	Frazil Ice in Rivers	DIVISION HD	
KEY WORDS MOTS CLEFS	FRAZIL ICE, FLOW RESISTANCE, HANGING DAM, ICE JAMS, ICE	SECTION EHS	
STUDY LEADER/ CHEF D'ETUDE	Tsang, G.	TEL: 637-4622	
TEAM MEMBERS/ MEMBRES D'EQUIPE		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT      April 1984      FIN	FINISH March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	D.F. Witherspoon, WP&M - OR	TEL: 932-4325 (Cornwall)	INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

To develop theories and methods to predict the distribution of frazil ice in rivers and the effects of frazil on river flows.

Performance Indicators/Indicateurs de rendement

1. Measure frazil distribution in a river and complete analyses and report by March 1985.
2. Obtain, from model study, the resistance of frazil and investigate the resistance to flow caused by a hanging dam with a report by March 1985.
3. Provide assistance to PILP contractor.

Relevance/Objet

Frazil ice can change the flow resistance in a river and affect the water level. It creates hanging dams which can cause flooding. It also causes problems by adhering to water intake structures. However, very little is known about frazil production and nothing is known about its distribution in rivers. A frazil instrument has been developed at NWRI which makes field measurement of frazil possible. Study of frazil can also help to quantify the effects of winter navigation extension.

Frazil ice production is a major consequence of extending navigation seasons in the St. Lawrence connecting channels. It may also be a major factor downstream of dams where the winter discharge is changed.

STUDY TITLE TITRE D'ETUDE	Water Quality and Quantity in Urban Runoff	DIVISION HD	
KEY WORDS MOTS CLEFS	URBAN RUNOFF, WATER QUALITY, MODELS, FLOODING FLOOD DAMAGE REDUCTION, ROAD DAMAGE	SECTION EHS	
STUDY LEADER/ CHEF D'ETUDE	Marsalek, J.	TEL: 637-4329 PAE EAP 1513	
TEAM MEMBERS/ MEMBRES D'EQUIPE	H. Ng, B. Greck (APWA)	FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT April 1984	FINISH FIN March 1985	NWRI, MTC, TCMP UNESCO, APWA
OPERATIONAL CONTACT OPERATIONNEL	S. Moin, WP&M - OR	TEL: 637-4711	INTEREST/INTERET <u>DIRECT</u> -GENERAL

#### Goals/Buts

To develop and improve models which will give quantitative assessments of water quality and quantity in urban runoff by 1990. To develop methods of mitigating the undesirable effects of stormwater runoff.

To complete technology transfer work on design floods and drainage manual by:

- a) determining the physical characteristics which control flow in channel networks;
- b) completion of field monitoring program for the Blair Rd. catchment;
- c) developing new procedures for road drainage design for Ministry of Transportation and Communications.

#### Performance Indicators/Indicateurs de rendement

1. Two UNESCO Urban Drainage Manuals, by March 1985
2. Contribution to Urban Design Flood Guide, by September 1984
3. Report on testing of channel junctions, by December 1984
4. Report of runoff simulation, using Burlington data by March 1985
5. Report on road drainage, by August 1984

#### Relevance/Objet

Urbanization has progressively altered the volume and quality of the runoff into the receiving water body. Management of the environment requires that the runoff process be understood so that prediction of effects can be made and remedies devised. The pollution loading information is useful for the IJC. The technology transfer work has been requested by the NRC Associate Committee on Hydrology and by UNESCO. The American Public Works Association (APWA) is partially funding the study of channel networks. Design of road drainage affects stormwater runoff. Proper design procedures can lead to better runoff control as well as large cost savings. This work is 100% cost recovery, sponsored by Ministry of Transport and Communications (MTC).

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STUDY TITLE TITRE D'ETUDE	Waterford River Basin - Newfoundland	DIVISION HD
KEY WORDS MOTS CLEFS	URBAN, RIVERS, RUNOFF, WATER QUALITY, NEWFOUNDLAND, SYSTEMS MODELLING, MARITIME PROVINCES	SECTION EHS
STUDY LEADER/ CHEF D'ETUDE	Marsalek, J.	TEL: 637-4329 PAE EAP 1513
TEAM MEMBERS/ MEMBRES D'EQUIPE	H. Ng., Technical Committee for Waterford River Study	FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START 1981 DEBUT	FINISH 1986 FIN
OPERATIONAL CONTACT OPERATIONNEL	T.W. Hennigar, WP&M, Dartmouth	TEL: 426-3266 <u>INTEREST/INTERET DIRECT-GENERAL</u>

Goals/Buts

1. Complete evaluation of runoff modelling for the urban test catchment by March 1985.
2. Evaluate the impacts of urbanization on water quality and quantity in the basin by 1986.

Performance Indicators/Indicateurs de rendement

1. Final report on runoff modelling by March 1985.
2. Final study report - 1986.

Relevance/Objet

Urbanization of the Waterford Basin will change the surface water quality and quantity. The effects of urbanization need to be investigated in order to develop guidelines for effective control and management of urban development. The study is jointly sponsored by DOE and the Province of Newfoundland. Hydraulics Division involvement has been requested by SDG, IWD.

STUDY TITLE TITRE D'ETUDE	River Flows with Mobile Beds	DIVISION HD
KEY WORDS MOTS CLEFS	ALLUVIAL RIVERS, BEDFORMS, ROUGHNESS, SEDIMENTS CUTOFFS, RIVER MODELS, FLOOD PLAINS, DIVERSIONS	SECTION EHS
STUDY LEADER/ CHEF D'ETUDE	Lau, Y.L.	TEL: 637-4327 PAE EAP 1513
TEAM MEMBERS/ MEMBRES D'EQUIPE	B.G. Krishnappan and P. Engel	FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT April 1984 FINISH FIN March 1985	
OPERATIONAL CONTACT OPERATIONNEL	A. Ellis, WP&M - HQ	TEL: 997-1461 INTEREST/INTERET <u>DIRECT-GENERAL</u>

#### Goals/Buts

To develop and improve theories and models which will allow accurate predictions of the transport and distribution of water and sediments in alluvial rivers, the dispersion of substances in rivers and the changes caused by developments such as cut-offs, dams and diversions. Develop methods for alleviating adverse effects.

- a) Modification of computer RIVMIX model for dispersion to include non-conservative substances.
- b) Initiate the expansion of MOBED model to predict 2-dimensional channel behaviour.
- c) Investigate effects of flood plain characteristics on flood flow distribution and effects of suspended sediment on flow using a turbulence model.
- d) Obtain new information and relationships for bedform roughness, response time and critical shear stress from laboratory experiments.
- e) Literature review of problems and effects of diversions.

#### Performance Indicators/Indicateurs de rendement

1. Modification of RIVMIX model numerical scheme & verification tests by March 1985.
2. Formulation of governing equations of MOBED by December 1984.
3. Report on flood plain flow by March 1985.
4. Review report on effects of diversions by August 1984.
5. Reports on form roughness of ribbed bed, friction factor for flows on dune beds, critical shear stress of graded sediments and response time of mobile bed flows.

#### Relevance/Objet

Developments of river basins can have drastic effects on river behaviour. To model such changes, flow and sediment transport in alluvial rivers must first be understood. The numerical model, MOBED is capable of predicting changes in flow depth and bed slope but needs extension for predicting lateral shifting, bank erosion, lateral distribution of velocity and flow depths etc. Will be useful for estimating effects of diversions, cutoffs and other engineering works. Predicting the mixing of substances is important especially when environmentally sensitive areas are concerned. Available model RIVMIX can be extended to include decaying substances.

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STUDY TITLE TITRE D'ETUDE	Suspended Sediments and Bed Load Measurement		DIVISION HD		
KEY WORDS MOTS CLEFS	BED LOAD, SUSPENDED SOLIDS, GRAIN SIZE, RIVERS BED FORM, SEDIMENTS, DUNES		SECTION EHS		
STUDY LEADER/ CHEF D'ETUDE	Engel, P.	TEL: 637-4737	PAE EAP 1513		
TEAM MEMBERS/ MEMBRES D'EQUIPE	Y.L. Lau, B.G. Krishnappan		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	April 1984	FINISH FIN	MARCH 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	B.L. Tassone, WRB - P&YR		TEL: 666-6207	INTEREST/INTERET <u>DIRECT-GENERAL</u>	

Goals/Buts

To develop theories, models and methods to measure and predict sediment transport by bed load and sediment suspension in rivers.

- a) Obtain a comparison of different techniques of estimating dune velocity.
- b) Obtain the hydraulic efficiency of different bedload samplers. (See 84-331).

Performance Indicators/Indicateurs de rendement

1. Two reports on bed load measurement techniques by March 1985.

Relevance/Objet

Sediments can be carried in suspension or can move as bed load. Suspended sediments can carry and distribute pollutants and are an important concern in many environmental issues. Accurate measurements of sediment loads are important for estimating life spans of reservoirs, river dredging requirements, etc. Efficient methods of sediment measurement can significantly reduce survey costs.

Sediment bed loads can significantly affect water intakes in rivers as well as changing roughness to increase flood levels.

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STUDY TITLE TITRE D'ETUDE	Ice Jams and Floods		DIVISION HD
KEY WORDS MOTS CLEFS	ICE JAMS, FLOODING, BREAKUP, FLOOD FORECASTING. MARITIME PROVINCES, ONTARIO		SECTION EHS
STUDY LEADER/ CHEF D'ETUDE	Beltaos, S.	TEL: 637-4329	PAE EAP 1513
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Wong, H. Ng		FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT April 1984	FINISH FIN March 1985	
OPERATIONAL CONTACT OPERATIONNEL	J. Keefe, WP&M - AR		TEL: 426-3266

Goals/Buts

To develop theories and models for ice jams and ice breakup, and develop methods to improve the management of ice-covered rivers to reduce flooding.

- a) Complete the analysis of historical water stage records at breakup and obtain criteria for forecasting time and flooding potential.
- b) Obtain field observations in Thames and Grand River sites of ice jams and their effects.
- c) Obtain test results in laboratory of conditions at toes of ice jams.
- d) Continue providing advice to Atlantic Region on ice problems as requested.
- e) Develop a model ice material for laboratory tests of ice jam removal by explosives.

Performance Indicators/Indicateurs de rendement

1. Report on historical data analyses by March 1985.
2. Two progress reports on ice jam observations by March 1985
3. Report on laboratory study of ice jams by March 1985.
4. Interim report on model ice material.

Relevance/Objet

Ice jams constitute a flooding threat which is presently not quantifiable. In addition, the inter-basin transfer of water and the installation of hydropower all require an assessment of the change in the ice regime. IWD Atlantic Region has been requesting advice on ice problems in various rivers since 1981.

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STUDY TITLE TITRE D'ETUDE	Engineering Services Section Operations		DIVISION HD
KEY WORDS MOTS CLEFS	ENGINEERING, SUPPORT, EQUIPMENT		SECTION ENSRVS
STUDY LEADER/ CHEF D'ETUDE	Roy, F.E.	TEL: 637-4280	PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1981	FINISH FIN Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A	TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To plan, organize, control, and direct the activities and programs of the Engineering Services Section.
2. To maintain and operate computer-aided design facilities and optics laboratory.
3. To report quarterly on project status relative to the agreed plans and schedules.

Performance Indicators/Indicateurs de rendement

1. Study planning documents prepared in accordance with Guideline time frame, in collaboration with other elements of NWRI.
2. Approval of Statement of Study Requirements and Engineering Project Plans for each approved study by 30 April, 1984.
3. HP 9845B System and optics laboratory available on demand.
4. Quarterly reports on project status in accord with agreed plans and schedules.

Relevance/Objet

Specialized engineering expertise and facilities provide an efficient and effective means to develop the systems and equipment required to undertake research programs in the environmental sciences.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 351
STUDY TITLE TITRE D'ETUDE	Engineering Support to Non-NWRI Research Studies		DIVISION HD
KEY WORDS MOTS CLEFS	NON-NWRI SUPPORT, ENGINEERING, EQUIPMENT		SECTION ENSRVS
STUDY LEADER/ CHEF D'ETUDE	Roy, F.E.	TEL: 637-4280	PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	ENSRVS		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1981	FINISH FIN Ongoing	NWRI Cost Recov.
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:  INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

To provide the engineering services of planning, analysis, design, and project management for systems and equipment required to support approved environmental research and surveillance studies conducted by Federal Government agencies other than the National Water Research Institute at the Canada Centre for Inland Waters.

#### Performance Indicators/Indicateurs de rendement

1. Approval of Statement of Study Requirements and Engineering Project Plans for each approved study by 31 May 1984.
2. Report quarterly on project status relative to the agreed plans and schedules.

The special engineering expertise available through the Engineering Services Section to agencies at the Canada Centre for Inland Waters, other than NWRI, provides an efficient and effective means for them to obtain equipment and apparatus needed for their environmental research studies.

#### Relevance/Objet

This study responds to needs for Engineering Support on approved studies conducted by Federal Government agencies other than NWRI. Expertise contributes to collaboration of Services and Departments at CCIW and to other IWD units.

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STUDY TITLE TITRE D'ETUDE	Frazil Ice Recorder	DIVISION HD
KEY WORDS MOTS CLEFS	FLOOD DAMAGE REDUCTION, N.B.-CANADA, RIVER ICE, FRAZIL	SECTION ENSRVS
STUDY LEADER/ CHEF D'ETUDE	Ford, J.S.	TEL: 637-4293 PAE 1516 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	N. Madsen, M. Pedrosa	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984 FINISH FIN	MARCH 1985 NWRI
OPERATIONAL CONTACT OPERATIONNEL	K. Wiebe, WRB - HQ	TEL: 997-1934 INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To complete development and evaluation of Frazil Ice Recorder begun under Study 83-377, and install in a New Brunswick river for field demonstration and training of WSC/Environment New Brunswick operators.

Performance Indicators/Indicateurs de rendement

1. Approval of Engineering Project Plan by 30 April, 1984.
2. Completion of System Evaluation and documentation by 31 July, 1984.
3. Completion of Field Work Plan and Installation Design by 31 July, 1984.
4. Completion of river installation and check out by 30 September, 1984.
5. Data compilation and final report by 30 March, 1985.
6. System recovery and restoration by 31 March, 1985.

Relevance/Objet

The rate of generation of frazil ice in rivers governs probability of hanging dam occurrence, flow obstruction and flood damage. This instrument was proposed to the N.B. River Ice/Flood Forecast Committee in 1982 and approved for NWRI action in 1983.

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STUDY TITLE TITRE D'ETUDE	C.A.R.P. (Cytometric algae recording project) Automated Algae & Bacteria Counting	DIVISION HD	
KEY WORDS MOTS CLEFS	COUNTER, ALGAE, BACTERIA, EUTROPHICATION, RIVERS	SECTION ENSRVS	
STUDY LEADER/ CHEF D'ETUDE	Desrosiers, R.	TEL: 637-4398	PAE 1516 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	R. Daley (P&YR), Hydraulics Specialist		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984 FINISH FIN March 1985		NWRI
OPERATIONAL CONTACT OPERATIONNEL	S. Whitlow, WQB - HQ	TEL: 997-3422	INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

To establish feasibility of developing a more automated method for counting algae & bacteria as they relate to river eutrophication studies.

#### Performance Indicators/Indicateurs de rendement

1. Approval of Engineering Project Plan.
2. Examination of features of commercially available cytometers, e.g. Becton, Dickinson, Ortho.
3. Determination of possible methods of discrimination between algae and bacteria, e.g. spectral, light-scattering, size, dye absorption.
4. Determination of whether the best features of commercially available cytometers may be combined with discrimination techniques to form the basis for a better sensor.
5. Development of a feasible system specification, and engineering report.

#### Relevance/Objet

Ref. P&Y Region Problems and Research Needs Item 5(f) or 5651.

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STUDY TITLE TITRE D'ETUDE	NWRI Program for Industry Laboratory Project (PILP)	DIVISION HD
KEY WORDS MOTS CLEFS	PILP, NWRI, TECHNOLOGY TRANSFER	SECTION ENSRVS
STUDY LEADER/ CHEF D'ETUDE	Ford, J.S.	TEL: 637-4293 PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	R. Desrosiers, A.S. Watson, J. Valdmanis	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984 FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	J.R. Rousseau, DOE/PILP Project Manager TEL: 997-2706	INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

To identify instrument or system developments which have general private sector market potential and inform DOE/PILP Evaluation Committee.

To support the transfer of technology to selected PILP contractors through the supply of relevant specifications and documentation and consulting services, on both on-going and new items.

Performance Indicators/Indicateurs de rendement

1. Provide prompt advice to the DOE/PILP Project Manager.
2. Provide information, advice and consultation to selected pilp contractors in accordance with schedules established by the DOE/PILP Project Manager.

Relevance/Objet

This study responds to DOE policy supporting the efficient transfer of technology developed at NWRI to Canadian industry for commercial exploitation.

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STUDY TITLE TITRE D'ETUDE	Computer-Aided Design System Development		DIVISION HD
KEY WORDS MOTS CLEFS	TECHNOLOGY, COMPUTER, PROCUREMENT		SECTION ENSRVS
STUDY LEADER/ CHEF D'ETUDE	Roy, F.E.		PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	R. Desrosiers, G. Dolanjski, S. Beal		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984	FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	Late	TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To set up an experimental work station based on the IBM Personal Computer for computer-aided design and drawing of schematics and two-dimensional mechanical parts to standard A and B size formats.

Performance Indicators/Indicateurs de rendement

1. Approval of Engineering Project Plan by 30 April, 1984.
2. Final selection of system design by 31 May, 1984.
3. Procurement of system components by 15 August, 1984.
4. System set up and training by 15 October, 1984.
5. Monitor and report on effectiveness by 30 March, 1985.

Relevance/Objet

The increasing availability of computer-based design tools must be exploited to improve ENSERVS/MANTEC capability and productivity.

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STUDY TITLE TITRE D'ETUDE	New Generation Data Logger - Pilot Run		DIVISION HD
KEY WORDS MOTS CLEFS	SEDWG, LOGGER, TEMPERATURE		SECTION ENSRVS
STUDY LEADER/ CHEF D'ETUDE	Ford, J.S.	TEL: 637-4293	PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	April 1984 FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	Late	TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To successfully demonstrate the suitability of some solid-state, data-logging system to be used in a temperature measurement test where a spatial array of readings is required over a period of time.

Performance Indicators/Indicateurs de rendement

1. The selection of the logger that is most suitable and cost effective.
2. The completion of a successful contract to bring in a pilot run of units that meet NWRI specifications.
3. The completion of a field trial.
4. The completion of a report of the results.

The above are to be achieved by the fiscal year end.

Relevance/Objet

Temperature measuring arrays for lake, river, and groundwater temperatures are expensive. To minimize losses and disappointments in research data the new generation of data loggers must be implemented.

STUDY TITLE TITRE D'ETUDE	Sampling Techniques Improvements Near Bottom		DIVISION HD
KEY WORDS MOTS CLEFS	SEDWG, SAMPLER, BOTTOM, LAKES		SECTION ENSRVS
STUDY LEADER/ CHEF D'ETUDE	Roy, F.E.	TEL: 637-4280	PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	Late	TEL:	INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

To take representative water samples in difficult zones of the lake column such as near the bottom in high-gradient situations or in special layers such as the Nepheloid layer.

#### Performance Indicators/Indicateurs de rendement

From the information gathered in 1983-84 continue on to accomplish:

1. The final recommendation of the types of samplers that NWRI should adopt to minimize sample errors caused by vertical smearing;
2. The development or purchase of a prototype of that sampler;
3. The preparation of the units for field intercomparisons by August 1984.
4. The report on the above activities.

#### Relevance/Objet

Research and surveillance of internal loading of lakes are hampered by the difficulties of accurately sampling in gradients near the bottom. The new apparatus is meant to facilitate near-bottom sampling without interfering with normal operations.

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STUDY TITLE TITRE D'ETUDE	ICAP Extensions		DIVISION HD
KEY WORDS MOTS CLEFS	SEDWG, INSTRUMENTATION		SECTION ENSRV5
STUDY LEADER/ CHEF D'ETUDE	Desrosiers, R.	TEL: 637-4398	PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	Late	TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

As an extension of the 1983-84 feasibility demonstration, the goals are to increase the capability of the Inductively Coupled Argon Plasma Analyser from analyzing one element accurately to twenty elements accurately. At the same time the technique will be modified to use less expensive components.

Performance Indicators/Indicateurs de rendement

1. The successful demonstration of a twenty-element ICAP analyzer with increased accuracy.
2. The inclusion of a lower cost amplifier detector subsystem..
3. A report describing the system and the degree of success achieved.

The above are to be complete by the fiscal year end.

Relevance/Objet

The new extensions have the potential of yielding a 20-fold increase in speed of analysis that is being done by Atomic Absorption instruments in present use at NWRI.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 359
STUDY TITLE TITRE D'ETUDE	Benthic Boundary Array		DIVISION HD
KEY WORDS MOTS CLEFS	SEDWG, BENTHOS, SEDIMENTS, LAKES, RESERVOIRS		SECTION ENSRVS
STUDY LEADER/ CHEF D'ETUDE	Valdmanis, J		TEL: 637-4293 PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	Late	TEL:	INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

To create a capability to measure the bottom stresses, sediment resuspension, and chemical parameters within one metre of the bottom of large lakes and reservoirs.

For the fiscal year 1984-85 the goals are to review the present systems under development elsewhere, produce a system design, and check out subsystems.

#### Performance Indicators/Indicateurs de rendement

1. Review of the state-of-the-art and a list of recommendations for limnological development.
2. The completion of the design concepts and specifications for critical review.
3. The initiation of subsystem selectory purchase, test and modification by fiscal year end.

#### Relevance/Objet

The damping factors in modelling lake dynamics are strongly dependent upon the bottom stress characteristics. As well, biochemical events are often linked with hydrodynamic episodes near the bottom brought on by storms. Research in both areas would benefit from this work.

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NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Support to NWRI Studies			DIVISION HD
KEY WORDS MOTS CLEFS	INSTRUMENTATION, TECHNOLOGY, DESIGN, DEVELOPMENT			SECTION MANTEC
STUDY LEADER/ CHEF D'ETUDE	Baird, S.D.	TEL: 637-4709		PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	MANTEC			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1981	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To provide manufacturing, technical development and consultation services to approved NWRI studies.

Performance Indicators/Indicateurs de rendement

Undefined at this time.

Relevance/Objet

Specialized scientific apparatus are designed and manufactured to keep abreast of technology in support of the collection and analyses of scientific data.

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NO: 84-  
361

STUDY TITLE TITRE D'ETUDE	Support to Non-NWRI Studies			DIVISION HD
KEY WORDS MOTS CLEFS	INSTRUMENTATION, TECHNOLOGY, DESIGN, DEVELOPMENT			SECTION MANTEC
STUDY LEADER/ CHEF D'ETUDE	Baird, S.D.	TEL: 637-4709		PAE EAP 1532
TEAM MEMBERS/ MEMBRES D'EQUIPE	MANTEC			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	1981	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	N/A			TEL:  INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To provide manufacturing, technical development, and consultation services in support of non-NWRI studies.

Performance Indicators/Indicateurs de rendement

Undefined at this time.

Relevance/Objet

Specialized scientific apparatus are designed and manufactured to keep abreast of technology in support of the collection and analyses of scientific data.

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NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Instrumentation Calibration Standards		DIVISION HD
KEY WORDS MOTS CLEFS	CALIBRATION, INSTRUMENTATION, MAINTENANCE, METEOROLOGY, STANDARDS		SECTION MANTEC
STUDY LEADER/ CHEF D'ETUDE	Baird, S.D.	TEL: 637-4709	PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Mollon, L. Peer, J. Dolanjski, M. Pedrosa, R. Boucher, H. Savile		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984	FINISH FIN Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A	TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To calibrate instrumentation systems and sensors to the National Traceable Standards of the laboratory.
2. To maintain the standards and to have them repeatedly cross-calibrated to the National Standards at NRC.
3. To develop calibration procedures and equipment to provide the calibration service for non-traceable parameters.
4. To acquire capital equipment to replace older standards and procedures to keep the laboratory abreast of international standards.

Performance Indicators/Indicateurs de rendement

- To report on a quarterly basis on client utilization of the service and produce a statistical record of equipment calibrations.
- To provide the services requested by the clients as expeditiously and with the highest quality as possible.
- To acquire by procurement a new D.C. Reference Standard to enable a historical cross-reference to be made against the present standard before the present standard becomes obsolete.
- To acquire by procurement a new Conductivity Standard to replace the present standard which is not as accurate as is required for modern instrument calibration.
- To acquire by procurement a laboratory computer system to provide for further automation of long term testing and on-line statistical analyses of calibration data.

Relevance/Objet

Scientific data collection equipment must be calibrated to determine the accuracy of the measure, for the validity of the data, and for the intercomparison of historical data. Traceability of standards allows for correlation of data from other institutes and services.

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NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Common User Test Equipment & Materiels Stores			DIVISION HD
KEY WORDS MOTS CLEFS	MATERIEL MANAGEMENT, PROCUREMENT, STORES, METALS			SECTION MANTEC
STUDY LEADER/ CHEF D'ETUDE	Baird, S.D.	TEL: 637-4709		PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	D. Whyte, K. Mollon, Storesman			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A	TEL:		INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To provide clients with material stores of electrical, electronic, mechanical and metallurgical parts and products. The service is designed to overcome duplication of parts inventories and procurement processes within the Institute.
2. To provide clients with a common user loan service of test equipment, tools and data recorders. The service is designed to overcome duplication of stock and procurement of low-usage moderate to high cost equipment.

Performance Indicators/Indicateurs de rendement

- To report on a quarterly basis on client utilization of the service and produce a statistical record of material and test equipment usage.
- To provide the service of parts and equipment to clients in an expeditious manner.
- To assist in centralizing storing and procurement of operational and design parts. This centralization would lead to a more efficient use of procurement funds and personnel utilization in the Institute.
- To assist in centralizing of test equipment will lead to a more efficient use ratio of low use equipment and lead to substantial saving of funds in procurement of low use equipment.

Relevance/Objet

Test equipment (low use) and parts are procured by various clients in anticipation of use. Hence, many items are duplicated throughout the Institute. This service is foreseen as a cost saving on inventory, manpower saving, and immediate availability of parts and equipment.

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NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Institute Equipment Maintenance and Manufacturing	DIVISION HD
KEY WORDS MOTS CLEFS	FIELD SUPPORT, INSTRUMENTATION, MAINTENANCE, WORKSHOP, METALS	SECTION MANTEC
STUDY LEADER/ CHEF D'ETUDE	Baird, S.D.	TEL: 637-4709 PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	D. Whyte, G. Olsen, J. Ford, K. Kalter H. Savile, R. Boucher, M. Pedrosa, J. Dolanjski	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1981	FINISH FIN Ongoing NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A	TEL: INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To provide clients with a prototype manufacturing source for mechanical and electronic equipment.
2. To provide clients with in-shop and field repair and maintenance service for mechanical and electronic prototype equipment.
3. To keep manufacturing machines and equipment up-to-date to enable manufacturing of equipment to highest standards.
4. To maintain manufacturing equipment in a safe, operative condition.
5. To provide for a safe working environment and safe practices.

Performance Indicators/Indicateurs de rendement

- To report on a quarterly basis on client utilization of this service and produce a statistical record of equipment manufactured and maintained.
- To provide the services requested by the clients as expeditiously and of the highest quality as possible.
- To acquire by procurement a new Colchester lathe to replace an older, non-repairable India lathe.
- To acquire by procurement a Rockwell belt sander to replace an older, non-repairable Rockwell sander.
- To acquire by procurement a sand-blasting facility to enable the blast preparation of equipment in the 1 m to 4 m range.
- To acquire by procurement a recirculating washer to enable degreasing of equipment.
- To report on action taken with respect to recommendations of Safety Committee.

Relevance/Objet

Scientific prototype equipment must be manufactured and maintained under strict controls to enable the collection of data of the highest quality.

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NO: 84-  
370

STUDY TITLE TITRE D'ETUDE	Office Support Services			DIVISION HD
KEY WORDS MOTS CLEFS	ADMINISTRATION, DATA COLLECTION			SECTION OFSRVS
STUDY LEADER/ CHEF D'ETUDE	Hawkins, M.	TEL:	637-4267	PAE EAP 1513
TEAM MEMBERS/ MEMBRES D'EQUIPE	D. Bowman, N. Snelling			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1981	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A	TEL:		INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To produce, edit, distribute and archive reports and publications, meeting specified quality, in both official languages.
2. To respond expeditiously to requests for reports and reprints and to keep records of such requests.
3. To provide efficient and effective services to Division for word processing, financial controls and records, and office equipment.
4. To provide general support to other Sections by assisting with seminars, meetings, and translations.
5. To maintain files of Shore Erosion Data (SLEDS) and respond to requests.

Performance Indicators/Indicateurs de rendement

- A report on production is filed quarterly. Samples of reports assessed for quality and format.
- Report on requests, including statistics of origins of requests, is submitted quarterly.
- Weekly reviews at Divisional meetings do not reveal lack of service.

Relevance/Objet

Effective communication of research accomplishments in both languages is essential to realize the benefits from the investment of time and money.  
Responsive and quick actions to requests for information and data improve and maintain good relations with clients and customers.  
Overall Divisional efficiency and effectiveness is improved.

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NO: 84-  
380

STUDY TITLE TITRE D'ETUDE	Drafting Services to CCIW			DIVISION HD	
KEY WORDS MOTS CLEFS	DRAFTING, ILLUSTRATING, PHOTOGRAPHY, VISUAL AIDS, REPROGRAPHICS			SECTION DRFTG	
STUDY LEADER/ CHEF D'ETUDE	Finn, W.D.	TEL: 637-4278		PAA EAP 1516	
TEAM MEMBERS/ MEMBRES D'EQUIPE	M. Donnelly, P. McColl, J. Van Nynatten, Contract			FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT	1981	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A			TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To provide drafting and illustrating services that include cartographic, scientific and technical illustration and graphic art as required for publication purposes and media activities.

- To provide photographic and reprographic services that include photography, slide and overhead projection transparencies and photo-reproductions.
- To provide occasional mechanical and architectural drafting services on shop layout, plan and detail drawings.

Performance Indicators/Indicateurs de rendement

Provide a quarterly report on the work done and statistics of work load including photographic support.

Relevance/Objet

High quality illustrations, drawings, photographs and slides are essential so that scientists and engineers at CCIW are able to communicate more effectively through their reports, publications and presentations. A drafting and photographic service improves the institute and CCIW overall efficiency.



## AQUATIC ECOLOGY DIVISION



## Aquatic Ecology Division

The Aquatic Ecology Division is involved in the solution of the problems associated with environmental degradation of Canadian waters due to eutrophication, acidification, and infestation by aquatic weeds, and with management of their quality.

The Aquatic Ecology Division is organized in three multidisciplinary sections: Ecological Impact, Great Lakes Rehabilitation, and Nutrient Pathways.

### Ecological Impact Section

The major area of research of the Ecological Impact Section is related to acidification of lakes with emphasis on the long-range transport of atmospheric pollutants. Studies emphasize sulfur isotope as tracers of acid rain; metal deposition from such sources as mining and smelting activities at Sudbury and Atikokan, Ontario and Rouyn-Noranda, Quebec; the use of diatoms as indicators of the acidification history of lakes and the impact of acidification on the carbon cycle in lake sediments. Other areas of research by section members include the impact of peat mining upon aquatic ecosystems; the application of statistical methodology to limnological problems; organic geochemistry of Great Lakes sediments; indicators of climatic change, and impacts of coal-fired power plants on the environment.

### Great Lakes Rehabilitation Section

The Great Lakes Rehabilitation Section conducts research on topics related to the Canada-U.S. Agreement on Great Lakes Water Quality. These topics include the chemical and biological response to lake management, the movement of nutrients and contaminants, the distribution of bottom dwelling organisms, the storage mechanism of nutrients in sediment and the distribution of aquatic macrophytes in response to nutrient loading and their chemical and mechanical control.

### Nutrient Pathways Section

The Nutrient Pathways Section concentrates on understanding the complex interrelated processes of nutrient availability (or limitation), algal growth (and biomass), nutrient regeneration, dissolved organic substances (their presence and defining their roles in the environment), zooplankton grazing, and lake restoration methods.



## STUDIES FOR AQUATIC ECOLOGY DIVISION

SECTION	STUDY	STUDY TITLE	STUDY LEADER	84/05/01.
DIVISION	401	AQUATIC ECOLOGY DIVISION RESEARCH MANAGEMENT AND ADMINISTRATION	BARICA, J.	
ECOLOGICAL IMPACT	405	TRACE METALS & ALUMINUM IN INTERSTITIAL WATER OF ACID LAKE SEDIMENTS	NRIAGU, J.O. & WONG, W.K.T.	
	406	EFFECTS OF CLIMATIC CHANGE ON WATER QUALITY	DELORME, L.D.	
	407	STATISTICAL ANALYSES OF ENVIRONMENTAL DATA	ESTERBY, S.R.	
	412	SULFUR POLLUTION IN LAKE SUPERIOR-ASSESSMENT BY ISOTOPIC TECHNIQUE	NRIAGU, J.O.	
	413	SULFUR ISOTOPIC VARIATION AS INDICATOR OF LAKE ACIDIFICATION CHANGES	NRIAGU, J.O.	
	414	ALGAL INDICATORS OF NATURALLY ACIDIC AQUATIC ECOSYSTEMS	GLOOSCHENKO, W.A.	
	415	DEPOSITION FROM COAL-FIRED POWER PLANTS & MINING ACTIVITIES	GLOOSCHENKO, W.A.	
	416	IMPACT OF ORGANIC WATERS ON PEATLAND DRAINAGE ON AQUATIC ECOSYSTEMS	DELORME, L.D.	
	417	EFFECTS OF CLIMATIC CHANGE ON WATER QUALITY OF PRAIRIE LAKES	BOURBONNIERE, R.A.	
	419	BIOGEOCHEMICAL PROCESS IN FRESHWATER SEDIMENTS	BOURBONNIERE, R.A.	
	495	SEDIMENT BANK - GREAT LAKES	BOURBONNIERE, R.A.	
GREAT LAKES	420	SEDIMENT PHOSPHORUS REGENERATION & RESUSPENSION IN LAKE ERIE	ROSA, F.	
	421	AQUATIC INVERTEBRATES AS INDICATORS OF CHANGING CLIMATE & ENVIRONMENT	KALAS, L.	
	423	INTERACTION BETWEEN BENTHIC BIOTA AND GREAT LAKES CONTAMINATION	KALAS, L.	
	424	LAKE ERIE WATER QUALITY TREND ANALYSIS	DOBSON, H.F.H.	
	425	NUTRIENT AND CONTAMINANT DOWNFLUXES IN LAKE ONTARIO	CHARLTON, M.N.	
	428	BIOAVAILABILITY OF PHOSPHORUS	MANNING, P.G.	
	477	MILFOIL CONTROL	PAINTER, S.	
	478	RONDEAU BAY REHABILITATION AND WATERSHED STUDY	PAINTER, S.	
	497	LAKE ERIE SURVEILLANCE CONTINUITY	CHARLTON, M.N.	
	498	CLADOPHORA MANAGEMENT IN LAKE ONTARIO	PAINTER, S.	
NUTRIENT PATHWAYS	432	DYNAMICS OF NUTRIENTS AND ORGANIC COMPOUNDS IN POLLUTED SYSTEMS	BROWNLEE, B.G.	
	433	MICROBIAL ACTIVITIES IN FRESHWATER ECOSYSTEMS	BURNISON, B.K.	
	436	IMPACT OF ORGANIC COLLOIDS ON SURFACE WATER QUALITY	LEPPARD, G.G.	
	437	REGULATING PHYTOPLANKTON COPRECIPITATION OF PHOSPHATE WITH CALCITE	MURPHY, T.	
	438	NUTRIENT TRANSFORMATION IN LAKES/BIOSYNTHESIS & CONTAMINANT INHIBITION	LEAN, D.R.S.	
	494	INFLUENCE OF COASTAL UPWELLING ON ALgal GROWTH	LEAN, D.R.S.	





PROCESSING FORM FOR DIVISION A3C

DATE RUN 84/05/02.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 401
STUDY TITLE TITRE D'ETUDE	Aquatic Ecology Division Research Management and Administration		DIVISION AED
KEY WORDS MOTS CLEFS	MANAGEMENT, ADMINISTRATION		SECTION AEDDIV
STUDY LEADER/ CHEF D'ETUDE	Barica, J.	TEL: 637-4227	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Major, F. Boyd		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:  INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

Plan, organize, manage and control the scientific and administrative program of the Aquatic Ecology Division.

#### Performance Indicators/Indicateurs de rendement

1. Direct study plan preparation and control study progress quarterly.
2. Provide liaison and coordination with other federal, provincial, and private agencies, and universities and ensure research grant reviews (Water Resources Research Support Program).
3. Prepare staff appraisal and promotion documents.
4. Convene regular section meetings, other impromptu meetings as required for program development, and ensure regular reviews of projects with project leaders and outside reviewers.
5. Provide secretarial services, administrative services, staff training, conference and program travel, photocopier and work processing services.

#### Relevance/Objet

To provide high scientific standard and applicability of research projects; to ensure high degree of efficiency, effectiveness and economy in the Division's projects and administration of A-Base and external funding under GLWQA and LRTAP.

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NO: 84-  
405

STUDY TITLE TITRE D'ETUDE	Trace Metals and Aluminum in Interstitial Water of Acid Lake Sediments	DIVISION AED
KEY WORDS MOTS CLEFS	PORE WATER, SEDIMENTS, METALS, ALUMINUM, ACID RAIN, NOVA SCOTIA, SUDBURY, ACID LAKES	SECTION EMPACS
STUDY LEADER/ CHEF D'ETUDE	Nriagu, J.O. and Wong, H.K.T.	TEL: 637-4223
TEAM MEMBERS/ MEMBRES D'EQUIPE	R.D. Coker, J. Kerekes (CWS), student(s)	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984 FINISH FIN March 1985	NWRI LRTAP, TCMP
OPERATIONAL CONTACT OPERATIONNEL	T.A. Clair, WQB - AR	TEL: 398-6606
		INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

Part A - Pore Water Chemistry

1. To investigate trace metals (see details below) and total aluminum at the sediment/water interface using the dialysis technique.
2. To characterize the chemical interactions (adsorption, desorption, chelation, etc.) between the dissolved and particulate metal species along a pH gradient.
3. To evaluate the mobility of toxic metal and aluminum ions in the lake sediments.
- \* 4. To develop a large volume pore water sampler utilizing the dialysis technique.

Part B - Lake Geochemistry

5. To complete laboratory and data analysis of samples collected during the 1983/84 field season in Algonquin Provincial Park and Kejimkujik National Park, N.S.
6. To determine the age of recent lake sediments in support of the interstitial water studies.

Performance Indicators/Indicateurs de rendement

- 1/2. Field monitoring of 2 softwater lakes in (A) Sudbury and 2 in (B) Kejimkujik areas complete by October, 1984. Laboratory analysis of over 500 samples for metals, nutrients, major ions, DOC etc. complete by February 1985.
- 3/4 Preliminary report for presentation to be completed by April 1985; reports for publication in scientific journal to be prepared subsequently.
- 5/6. completion of part B by March 1985, with pertinent reports.

Relevance/Objet

Lake sediments often contain a large reservoir of toxic metals which potentially can be released during lake acidification. Acid induced release of aluminum from sediment is a related topic of fundamental importance which has yet to be systematically studied under in situ conditions.

\* (design only, no allocation for engineering costs this FY)

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Plan d'étude

NO: 84-  
406

STUDY TITLE TITRE D'ETUDE	Effects of Climatic Change on Water Quality			DIVISION AED
KEY WORDS MOTS CLEFS	CLIMATIC CHANGE, WATER QUALITY, INVERTEBRATES, OSTACODES, PALEOLIMNOLOGY			SECTION EMPACS
STUDY LEADER/ CHEF D'ETUDE	Delorme, L.D.		TEL: 637-4317	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	N.S. Harper			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FY 1983/84	FINISH FIN	MARCH 1985
OPERATIONAL CONTACT OPERATIONNEL	M. Quast, WRB - HQ			TEL: 994-1933
				INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. To collect several cores from 3 lakes selected during 1983-84 FY, and process the cores.
2. To enumerate fossil pollen to determine the start of the Ambrosia zone; to enumerate the shelled invertebrates (ostracodes) for interpretation of past water quality and climate.
3. Statistical evaluation of the relationship between climate, water quality, and certain aquatic organisms.
4. Completion of Turkey Lakes paleolimnological research.

Performance Indicators/Indicateurs de rendement

1. Internal sedimentological data report, December 1984.
2. Internal paleolimnology report, February 1985 and internal invertebrate report, March 1985.
3. Internal report on relationship between climate, and water quality to be used as basis for final manuscript, March 1985.
4. Internal reports on Turkey Lakes paleolimnology, December 1984 and final report (manuscript) on Turkey Lakes, March 1985.

Relevance/Objet

To advance knowledge of role of climatic change upon water quality of lakes for development of predictive models.

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NO: 84-  
407

STUDY TITLE TITRE D'ETUDE	Statistical Analyses of Environmental Data		DIVISION AED	
KEY WORDS MOTS CLEFS	STATISTICAL MODELLING, CALIBRATION, LRTAP, WATER QUALITY, NIAGARA R., TOXIC SUBSTANCES, GREAT LAKES,		SECTION EMPACS	
STUDY LEADER/ CHEF D'ETUDE	Esterby, S.R.	TEL: 637-4362	PAE 1514 EAP	
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Kuntz (WQB)		FUNDING SOURCE FINANCEMENT NWRI	
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984		FINISH FIN
OPERATIONAL CONTACT OPERATIONNEL	S. Whitlow, WQB - HQ		TEL: 997-3422	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. To determine statistical models suitable for describing variability of substances in low concentrations in the environment especially the Niagara River.
2. To illustrate how results can be used to determine the existence of trends on sampling program design.
3. To continue analysis of surveillance data for temporal and spatial variations.
4. To determine trends in river water quality data.

Performance Indicators/Indicateurs de rendement

1. Review of statistical models, June 1984.
2. Preparation of computer programs and data analysis, December 1984.
- 3/4. Report on analyses and statistical methodology, March 1985.

Relevance/Objet

The 1978 GLWQA requires determination of achievement of Specific Objectives based upon statistically valid sampling data. This study provides information useful in both the formulation and determination of specific objectives. It also is relevant to other studies including LRTAP and water quality monitoring.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 412
STUDY TITLE TITRE D'ETUDE	Sulfur Pollution in Lake Superior - Assessment by Isotopic Technique		DIVISION AED
KEY WORDS MOTS CLEFS	LAKE SUPERIOR, SULFUR, ISOTOPES, SEDIMENTS, SULFUR DIAGENESIS		SECTION EMPACS
STUDY LEADER/ CHEF D'ETUDE	Nriagu, J.O.		TEL: 637-4223 PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	R.D. Coker		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	NWRI LRTAP
OPERATIONAL CONTACT OPERATIONNEL	Head, WQB - OR		TEL: 637-4663 INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. Determine the concentration and isotopic composition of sulfur in waters of Lake Superior.
2. Determine the forms of sulfur and the isotopic composition of each sulfur fraction in sediment samples from Lake Superior.
3. Evaluate the cycling of sulfur in Lake Superior and assess (isotopically) the recent changes in the flux of sulfur pollution into this lake.

#### Performance Indicators/Indicateurs de rendement

1-3. Report on sulfur pollution and isotopic chemistry of sulfur in Lake Superior by March 1985. (Subject to additional LRTAP funding).

#### Relevance/Objet

Lake Superior contains uniquely low levels of sulfur. In view of the long flushing time, some of the sulfate presumably has been in the water for many decades. The isotope technique can be used to estimate the fraction of pollutant sulfur in the water of this and similar lakes. This study thus addresses the "Atmospheric Pollution Indicators" in the Great Lakes Basin (1983 SAB Annual Report).

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
413

STUDY TITLE TITRE D'ETUDE	Sulfur Isotopic Variation as an Indicator of Past Changes in Lake Acidification	DIVISION AED	
KEY WORDS MOTS CLEFS	SULFUR, ISOTOPES, POLLUTION, METALS, LEAD - 210 DATING, TURKEY LAKES, NOVA SCOTIA	SECTION EMPACS	
STUDY LEADER/ CHEF D'ETUDE	Nriagu, J.O.	TEL: 637-4223 PAE EAP 4200	
TEAM MEMBERS/ MEMBRES D'EQUIPE	H.K.T. Wong, R.D. Coker, J. Kerekes	FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT 1984	FINISH FIN 1986	LRTAP NWRI
OPERATIONAL CONTACT OPERATIONNEL	T.L. Pollock, WQB - AR	TEL: 388-6606	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. Establish an isotopic and mass balance for sulfur in a calibrated watershed by monitoring the flux of sulfur into, and out of, the various components of the Turkey Lakes basin.
2. Relate the dated profiles of the metals and sulfur isotopes to historical changes in the flux of long-range transported materials into selected lakes in the Kejimkujik National Park (Nova Scotia) and in the Turkey Lakes area.

Performance Indicators/Indicateurs de rendement

1. Derive an isotopic balance for sulfur in the Turkey Lakes watershed and use it to check the mass balance models for this element - March 1985.
2. Prepare a report on chemical indices of past changes in lake acidification by March 1985. (Subject to additional LRTAP funding).

Relevance/Objet

The study fills an important gap in the ECS Acid Rain Program. Sulfur isotopic variations can be used to fingerprint the sources, dispersion pathways and ultimate sinks for pollutant sulfur in lakes. Sulfur is closely linked to the toxic metals in term their long-range transport and flux into lake basins.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
414

STUDY TITLE TITRE D'ETUDE	Algal Indicators of Naturally Acidic Aquatic Ecosystems	DIVISION AED
KEY WORDS MOTS CLEFS	ACIDITY, ALGAE, ECOLOGY, ECOSYSTEM, INVERTEBRATES, PHYTOPLANKTON, WETLANDS, ACID LAKES, NOVA SCOTIA	SECTION EMPACS
STUDY LEADER/ CHEF D'ETUDE	Glooschenko, W.A.	TEL: 637-4229
TEAM MEMBERS/ MEMBRES D'EQUIPE		PAE EAP 4200
TIME FRAME CALENDRIER	START DEBUT 1 Apr. 1984 FINISH FIN	
OPERATIONAL CONTACT OPERATIONNEL	D. Haffner, WQB - HQ	TEL: 997-3422

Goals/Buts

1. To review literature on algal indicators of lake acidification and algal composition and ecology of acidic wetlands.
2. To characterize algae and invertebrates found in shield acidic wetlands (fens, marshes and bogs) and their chemical habitat.
3. To determine nature of export of biota from acidic wetlands into adjacent water bodies including streams and lakes.
4. To determine the value of diatoms as paleoindicators of lake acidification.

Performance Indicators/Indicateurs de rendement

1. Literature review completed by September 1984.
2. Field sampling of biota with taxonomic identifications from selected (by April 1984) naturally acidic water bodies, sediment and water samples for chemical analyses completed by December 1984.
3. To determine the diatom composition of a core collected from Nova Scotia.
4. Preliminary report in March 1985. (Subject to LRTAP funding).

Relevance/Objet

To further understand the acidification history of lakes, use has been made of diatoms distribution in sediment cores. This study will determine the contribution of algae and invertebrates from acidic wetlands surrounding lakes to further understand the value of biotic indicators, especially algae, of acidification.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
415

STUDY TITLE TITRE D'ETUDE	Atmospheric Deposition from Coal-Fired Power Plants and Mining Activities		DIVISION AED
KEY WORDS MOTS CLEFS	ATMOSPHERIC DEPOSITION, BIOGEOCHEMISTRY, COAL, QUEBEC, CONTAMINANTS TRANSPORT, LRTAP, METALS, PLUME, SAS.S		SECTION EMPACS
STUDY LEADER/ CHEF D'ETUDE	Glooschenko, W.A.	TEL: 637-4229	PAE EAP 4200
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Nriagu, R. Strachan, ECD, R. Protz (Univ. of Guelph), V. Glooschenko, OMNR		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1983	FINISH FIN March 1986	NWRI
OPERATIONAL CONTACT OPERATIONNEL	F.C. Elder, IWD - LRTAP Coordinator		TEL: 637-4212
INTEREST/INTERET <u>DIRECT</u> -GENERAL			

Goals/Buts

1. To conduct a baseline study of trace metals, As, Se and S on Sphagnum mosses, littoral macrophytes, lichens, peat, and plant litter in areas of intensive mining activity and near coal-fired plants.
2. To determine scientifically-valid, cost-effective biotic monitors of atmospheric metal deposition and organochlorine contaminants.
3. To investigate regional differences in atmospheric metal deposition in Northern vs Southern Ontario.

Performance Indicators/Indicateurs de rendement

1. Complete lab analysis of 1983 samples by June 1984.
2. Complete field sampling, S. Ont. to N. Ont. and adjacent Quebec and Saskatoon by October 1984; Complete laboratory analysis of 1984 samples by January 1985.
3. Prepare two papers on the subject of research by March 1985.

Relevance/Objet

Coal-fired power plants and mining activities are major sources of atmospheric emissions of metals, S, As, and Se to adjacent aquatic ecosystems. This study will develop biotic monitors of atmospheric deposition to supplement direct precipitation sampling in remote areas.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
416

STUDY TITLE TITRE D'ETUDE	Impact of Organic Waters on Peatland Drainage on Aquatic Ecosystems	DIVISION AED
KEY WORDS MOTS CLEFS	AQUATIC ENVIRONMENTS, PEAT, CONTAMINANTS, ECOSYSTEM, NOVA SCOTIA, NUTRIENTS, ACIDITY, LRTAP, ENERGY	SECTION EMPACS
STUDY LEADER/ CHEF D'ETUDE	Glooschenko, W.A./Bourbonniere, R.A. TEL: 637-4229	PAE 1514 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984 FINISH FIN April 1988	LRTAP, NWRI PERD
OPERATIONAL CONTACT OPERATIONNEL	C. Hanlon, PERD	TEL: 997-2706
INTEREST/INTERET <u>DIRECT</u> -GENERAL		

Goals/Buts

1. To assist DOE in developing policies on peatland utilization for energy production and its environmental impact.
2. To improve understanding of the environmental impact of peatland drainage and exploitation upon adjacent streams and lakes.
3. To review use of indicator species of peatland biota (algae, invertebrates) and biochemical markers that can be used to trace drainage impact from peatlands into nearby lakes and streams.
4. To characterize the chemical composition, both organic and inorganic, of water and peat from peatlands and peatland outflow. Specific chemicals to include hydrophobic and hydrophilic organics, lipids, and humic acids. Inorganics to include sulfur, acids and trace metals.
5. To characterize lake and river waters from 3-5 LRTAP sites in Nova Scotia as in (4) above, show how natural organic acidity contributes to the total acidity.

Performance Indicators/Indicateurs de rendement

- 1-2. Select field locations. Begin sampling of peats and drainage waters, and receiving waters for chemical and biological characterization in Spring 1984. Sites will include Luther Bog (S. Ont.) and Barrington Bog (N.S.). Sampling to continue through FY 85/86.
- 3-4. Conduct chemical analyses of field samples; identify biological samples by March 1985.
5. Conduct field sampling and processing in conjunction with bog sampling in Summer 1984. Conduct laboratory analyses with preliminary report by March 1985.

Relevance/Objet

- 1-4. The large scale use of peat for energy production has a potential impact upon nearby lakes and streams. Such a study would enable us to predict the impact of peat mining upon aquatic ecosystems and increase our knowledge of natural acidification processes. S. Day, EPS-Atlantic Region (A/Chief, WPCD), S. Anderson, Nova Scotia Dept. of Mines and Energy.
5. Natural organic acidity has been recognized as a significant contributor to the total acidity of Nova Scotia river. As such it affects our understanding of the degree to which airborne pollutants impact those waters. Requested by Atlantic Region LRTAP Program, J. Kerekes, CWS-Halifax.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
417

STUDY TITLE TITRE D'ETUDE	Effect of Climatic Change on Water Quality of Prairie Lakes		DIVISION AED
KEY WORDS MOTS CLEFS	PALEOCLIMATE, PALEOLIMNOLOGY, WATER QUALITY, PRAIRIES, CLIMATIC CHANGE, PROXY DATA, DROUGHT, INVERTEBRATES		SECTION EMPACS
STUDY LEADER/ CHEF D'ETUDE	Delorme, L.D.	TEL: 637-4317	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	N.S. Harper, summer student		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984	FINISH FIN March 31, 1987	NWRI CCP
OPERATIONAL CONTACT OPERATIONNEL	M. Quast, WRB - HQ		TEL: 994-1933
<u>INTEREST/INTERET DIRECT-GENERAL</u>			

Goals/Buts

It is proposed that since the drought issue is increasing in momentum, N-S transects of lakes be studied from the prairie region. Selection of these transects would be done in consultation with the IWD - Western and Northern Region.

1. To collect 2 cores from a selected lake from the prairie provinces.
2. To enumerate fossil pollen to determine the start of the Ambrosia zone; to enumerate the shelled invertebrates (ostracodes) for interpretation of past water quality and climate.
3. Statistical evaluation of the relationship between climate, water quality, and certain aquatic organisms.

Performance Indicators/Indicateurs de rendement

Internal sedimentological report on the cores collected.

Internal palynology report.

Enumeration of shelled invertebrates.

Progress report by March 31, 1985.

Relevance/Objet

To advance knowledge of the role of climatic change upon the water quality and productivity of lakes for the development of a predictive model to estimate future trends.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 419
STUDY TITLE TITRE D'ETUDE	Biogeochemical Process in Freshwater Sediments		DIVISION AED
KEY WORDS MOTS CLEFS	BIOGEOCHEMISTRY, PALEOLIMNOLOGY, IMPACT, SEDIMENTS, ACID LAKES, ORGANICS, GREAT LAKES, GEOLIPIDS,		SECTION EMPACS
STUDY LEADER/ CHEF D'ETUDE	Bourbonniere, R.A.		TEL: 637-4547 PAE EAP 4200
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Nriagu; D.C.L. Lam and A.G. Bobba, J.A. Robbins, B.J. Eadie, S.J. Eisenreich; I.P. Martini J.S. Mothersill, R. Drimmie, R. Rossman		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT FY 81/82	FINISH FIN March 1986	NWRI, FIP CANADA WORKS
OPERATIONAL CONTACT OPERATIONNEL	M. Forbes, WQB - HQ		TEL: 997-1921 INTEREST/INTERET <u>DIRECT-GENERAL</u>

#### Goals/Buts

- A. Investigate naturally occurring organic components in acid shield lakes which are biochemical markers of ecological change (compl. of AED 410 from FY 83/84).
- B. Determine present and historical fluxes of organic and inorganic components in high sedimentation rate areas of the Great Lakes, model time-dependent input and transformation process and relate biogeochemistry of Great Lakes sediment to paleoenvironmental conditions. (Continuation of 83/84 Study #419).

#### Performance Indicators/Indicateurs de rendement

- A.1. Complete GC and GC/MS analyses on sediment and suspended particulate samples from Sudbury area lakes extracted in previous years by September 1984.
- 2. Complete manuscript on Sudbury biochemical markers begun in FY 83/84 by September 1984.
- 3. Prepare manuscript on lipid cycling in Sudbury area lakes incorporating suspended particulate, sediment and auxilliary data by March 1985.
- B.1. Complete geochemical analyses on L. Erie cores begun in FY 83/84 by September 1984; manuscript by December 1984.
- 2. Begin geochemical analyses on L. Superior cores collected in FY 83/84. Geolipid analyses on L. Superior cores begin July, continue into FY 85/86.
- 3. Model time-dependent changes of geolipids in L. Ontario cores (with APSD). Report on model by March 1985.
- 4. Complete organic and inorganic analyses on L. Erie piston core begun in FY 83/84 by March 1985.
- 5. Complete manuscript(s) on L. Ontario piston core begun in FY 83/84 by December 1984.

#### Relevance/Objet

- A. Geolipids are good biological markers and will aid in distinguishing between natural and cultural causes of lake acidification. This part of the study relates not only to the LRTAP problem, but has some relevance to the problems of organic watersheds in general.
- B. We must build upon knowledge of paleoenvironmental events in order to understand the significance and ecological impact of present-day and future geochemical events. This study relates to the international effort to rehabilitate and manage the Great Lakes Basin.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
420

STUDY TITLE TITRE D'ETUDE	Sediment Phosphorus Regeneration and Resuspension in Lake Erie	DIVISION AED	
KEY WORDS MOTS CLEFS	LAKE ERIE, BIOAVAILABILITY, EUTROPHICATION, SEDIMENTS, PHOSPHORUS, NITROGEN, RESUSPENSION, CURRENTS	SECTION GRLRHS	
STUDY LEADER/ CHEF D'ETUDE	Rosa, F.	TEL: 637-4547 PAE EAP 1514	
TEAM MEMBERS/ MEMBRES D'EQUIPE	P.G. Manning	FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT Apr. 1983	FINISH FIN March 1988	GLWQA NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Gregor, WQB - W&NR	TEL: 359-5321	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. Measure resuspension and regeneration of nutrients from Lake Erie sediments.
2. Correlate the movement of particulate nutrients with season and different current regimes.
3. Determine the iron-phosphorus relationships of sediment available phosphorus.
4. Measure gradients in the concentration of nutrients in porewater of sediments to allow eventual analysis of internal diffusive loading.

Performance Indicators/Indicateurs de rendement

1. Install and replace apparatus 3 times, sample sediments and water chemistry during 6 cruises, Central Basin L. Erie, April to October 1984.
2. Report on correlation of in situ currents with nutrient resuspension by March 1985 (Lake Erie).
3. Complete "bioavailable P" and iron-P analyses by Sept. 1985 (Lake Erie).
4. Contract expert in porewater gradients for consultation and training; install and recover peeper apparatus 3 times and report on temporal variation by March 1985 (Lake Erie).

Relevance/Objet

Internal loading (sediment to water) is an important process in lakes. To assess the efficiency of present external loading reductions and the importance of future reductions there should be more research on the internal loading and the bioavailability of sediment P (GLWQA, Annex 3, 1983).

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
421

STUDY TITLE TITRE D'ETUDE	Aquatic Invertebrates as Indicators of Changing Climate and Environment		DIVISION AED
KEY WORDS MOTS CLEFS	CLIMATIC CHANGE, PALEOLIMNOLOGY, BENTHOS, BOTTOM SUBSTRATES, GREAT LAKES, LAKE ONTARIO, INVERTEBRATES		SECTION GRLRHS
STUDY LEADER/ CHEF D'ETUDE	Kalas, L.	TEL: 637-4506	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT April 1984	FINISH FIN March 1985	CCP NWRI
OPERATIONAL CONTACT OPERATIONNEL	M. Quast, WRB - HQ		TEL: 994-1933
			INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To obtain high quality signature of the past climatic changes
  - (a) from investigation of the cladoceran and other remains of invertebrates encountered in the Lake Ontario sediment cores and
  - (b) from relating palynological, paleolimnological, geochemical and geochronological evidence.
2. To correlate recognized variability and trends with climatic fluctuations elsewhere and draw interferences to sequence, amplitude, and frequency of various climatic events.
3. To put into a historical perspective prospects for foreseeable climatic and environmental changes in the Great Lakes region.

Performance Indicators/Indicateurs de rendement

1. Acquaintance with the latest improvements in paleoclimatological techniques in major paleolimnological labs in N. America and review of literature on the subject (April – June 1984).
2. Feasibility tests on a group of Lake Ontario sediment cores collected during 1982-83 ecobenthological surveillance and selection of cores from the most suitable sites to work with (June 1984).
3. Extrusion of sediment from core linings, processing increments and analyses of insoluble organic remains elutriated from sub-samples; consulting and service from specialists in palynology, geochemistry and related fields (July – December 1984).
4. Progress report preparation (January – March 1984).

Relevance/Objet

The study plan responds to one of CCP's most pressing concerns, predictability of climatic changes and their local and regional impact on natural and human ecosystems.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 423	
STUDY TITLE TITRE D'ETUDE	Interaction Between Benthic Biota and Great Lakes Contamination		DIVISION AED	
KEY WORDS MOTS CLEFS	ECOTOXICITY, BOTTOM SUBSTRATES, BENTHOS, INVERTEBRATES, HARBOURS, DREDGING, GREAT LAKES, REHABILITATION		SECTION GRLRHS	
STUDY LEADER/ CHEF D'ETUDE	Kalas, L.		PAE EAP 1514	
TEAM MEMBERS/ MEMBRES D'EQUIPE	M. Fox, A. Mudroch		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	MARCH 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Haffner, WQB - HQ		TEL: 997-3422	INTEREST/INTERET <u>DIRECT-GENERAL</u>

### Goals/Buts

1. Determination and comparison of composition and biomass of benthic fauna on sites impaired with pollution, dredging operations and dredged spoils disposal with communities living in relative undeteriorated and undisturbed environments.
2. Development and testing an appropriate technique for investigation of the means by which benthic invertebrate fauna vital requirements are met in field and in laboratory bioassay experiments.
3. Study of detritivorous, coprophagous and filter feeding processes in freshwater invertebrates and effect of their swimming and burrowing behaviour on water quality, and sediment structure, cycling of toxic chemicals and nutrients in lake environment.

### Performance Indicators/Indicateurs de rendement

1. Report on collection and analysis of min. 50 new bottom sediment samples with benthic macrobiota from selected offshore and nearshore sites (March 1985) (a) Lake Ontario : Niagara River plume and Rochester transects; Hamilton, Toronto and Oshawa harbours (2 cruises, May - September 1984) (b) Lake Erie : Central basin transect; (1 cruise, May - November 1984) Rondeau Bay (field work, summer 1984).
2. Literature and equipment survey for selection of suitable procedures for investigation of function of the macrofauna in benthic ecosystems and for study of tolerance and sensitivity of benthic invertebrates to environmental change (June 1984).
3. Report on occurrence, and separation of macroscopic aggregates (fecal pellets, pellet sands) and organic detritus from sediment samples with different type and degree of pollution into coarse, medium and fine particle size fraction and their use with various groups of benthic organisms in bioassay experiments (March 1985).

### Relevance/Objet

Planned ecobenthological research is directed to a major and the most important entry point of pollutants from external environment into and along a food web that could eventually include and terminate with humans. Information obtained through the ecobenthological analysis and experiments will be useful in detecting the strength and distribution of various kinds of pollution and environmental disturbance versus the successive stages of improvement and lake bottom ecosystem recovery.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
424

STUDY TITLE TITRE D'ETUDE	Lake Erie Water Quality Trend Analysis		DIVISION AED
KEY WORDS MOTS CLEFS	ATLAS, DATA HISTORICAL, EUTROPHICATION, GREAT LAKES SURVEILLANCE, LAKE ERIE, NUTRIENTS, OXYGEN-DISSOLVED		SECTION GRLRHS
STUDY LEADER/ CHEF D'ETUDE	Dobson, H.F.H.		TEL: 637-4506 PAE EAP 1113
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Williams, IWD-OR		TEL: 637-4531 <u>INTEREST/INTERET DIRECT-GENERAL</u>

Goals/Buts

1. To complete the interpretation of spatial and seasonal cycle features of Lake Erie water - chemistry parameters (temperature, oxygen, nutrients, particulate organic matter, major ions, and trace metals).
2. To display and interpret fluctuations and trends, 1966 to 1983, in the nutrient related parameters of the three basins of Lake Erie, based on a synthesis of Canadian and U.S. surveillance data.

Performance Indicators/Indicateurs de rendement

1. Submit revised collation of available diagrams (First edition of atlas), by June 1, 1984.
2. Submit report on fluctuations and trends of water quality parameters (1966-83) by March 1985.

Relevance/Objet

Interpretive data development is necessary to draw conclusions from past lake surveys. Lake Erie is undergoing profound changes from U.S./Canadian phosphorus loading reduction and increased nitrogen loadings. This research will be valuable to the IJC, Canadian government, U.S. government and the Great Lakes public.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
425

STUDY TITLE TITRE D'ETUDE	Nutrient and Contaminant Downfluxes in Lake Ontario			DIVISION AED
KEY WORDS MOTS CLEFS	DECOMPOSITION, CONTAMINANTS, EUTROPHICATION, FATE, LAKE ONTARIO, PLUMES, SEDIMENTS, PHYTOPLANKTON, NIAGARA RIVER			SECTION GRLRHS
STUDY LEADER/ CHEF D'ETUDE	Charlton, M.N.	TEL:	637-4220	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	W.G. Booth, B.G. Oliver, J. Roff (Univ. of Guelph)			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	March 1985 NWRI
OPERATIONAL CONTACT OPERATIONNEL	R. Stevens, WQB - OR			TEL: 637-4641 <u>INTEREST/INTERET DIRECT-GENERAL</u>

Goals/Buts

1. Complete analysis of sedimentation and primary production experiments conducted 1981-83.
2. Investigate particle trapping and retention capability of sediment traps in relation to the particle size distribution in nature to clarify the applicability of sediment trap techniques for determining the movement of contaminants and nutrients.

Performance Indicators/Indicateurs de rendement

1. Produce manuscripts on Niagara River work 1981-82 and on extended sediment trap work in 1983, 2 manuscripts by March 1985.
2. Contract experiments in large-scale flume at Univ. of Guelph on the trapping of different size particles and the improvement of sediment trap design, work completed and report written by March 1985.

Relevance/Objet

The movement of contaminants and nutrients has been studied with sediment traps near the Niagara River and over L. Ontario. This work is intended to reveal linkages between eutrophication and the elimination of contaminants from the lake. Sediment traps are being used increasingly world-wide, more should be learned about their properties.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
428

**STUDY TITLE**

TITRE D'ETUDE

Bioavailability of Phosphorus

DIVISION  
AED

**KEY WORDS**  
MOTS CLEFS

BIOAVAILABILITY, PHOSPHORUS, SEDIMENTS, IRON, PRAIRIES,  
SUSPENDED SEDIMENTS, NON-POINT SOURCE, LAKE ERIE

SECTION  
GRLRHS

**STUDY LEADER/**  
**CHEF D'ETUDE**

Manning, P.G.

TEL: 637-4232

PAE  
EAP 1514

**TEAM MEMBERS/**  
**MEMBRES**  
**D'EQUIPE**

T. Mayer

FUNDING SOURCE  
FINANCEMENT

**TIME FRAME**  
**CALENDRIER**

START FINISH  
DEBUT DEBUT FIN FIN

Apr. 1984

Sept. 1985

NWRI  
GLWQA

**OPERATIONAL**  
**CONTACT**  
**OPERATIONNEL**

Head, WQB - P&YR

TEL:  
544-6019

INTEREST/INTERET  
DIRECT-GENERAL

Goals/Buts

To advance knowledge of P-Fe relationships in abatement of eutrophication through:

- Initiation of new studies on the bioavailability of P in non-point sources. River and nearshore suspended particulates will be examined for Fe-P relationships.
- Initiation of new studies on bioavailable P in selected Prairie (W&N Region) and Western (P&Y Region) lakes. Recently developed methods at NWRI will be applied to existing nutrient problems.
- Determination of NAIP and ferric hydroxide concentrations in two cores from Lake Erie (support of AED 420) and one from an acid (Sudbury) lake.

Performance Indicators/Indicateurs de rendement

- Analysis of suspended particulates and shore erosive materials, NAIP and Fe fractions using chemical extraction and Mossbauer studies. Feasibility study completion by September 1985. Sample collection in summer and fall of 1984. The north shore of Lake Erie will be investigated.
- Retrieve sediment cores and suspended particulates from, e.g. Wood Lake, B.C., (P&YR), in summer and autumn of 1984. Main methods of analysis are Mossbauer and chemical analytical. Results will be assessed in September 1985.
- Retrieve three cores from the Central Basin of Lake Erie in September 1984 and Mossbauer in the winter of 1984/85. A core will also be retrieved from an acid lake, near Sudbury. Completion by September 1985.

Relevance/Objet

The bioavailability of P in nearshore and eutrophic and hypertrophic Western lakes are important water quality management problems. NWRI developed spectral methods will be applied (in cooperation with IWD - W&N and P&Y Regions).

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Study Plan  
Plan d'étude

NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Dynamics of Nutrients and Organic Compounds in Polluted Systems		DIVISION AED
KEY WORDS MOTS CLEFS	AMMONIA, B.C., YUKON, PRAIRIES, CANAGAGIGUE CREEK, CONTAMINANTS, EUTROPHICATION, MODELS, NITRIFICATION		SECTION NUPROS
STUDY LEADER/ CHEF D'ETUDE	Brownlee, B.G.	TEL: 637-4221	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	G.A. MacInnis, D.S. Painter		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI TCMP
OPERATIONAL CONTACT OPERATIONNEL	D. Valiela, WQB - P&YR		TEL: 666-6038
			INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

- Environmental behaviour of benzothiazoles. To test in aquaria and in situ whether the proposed diffusion model for the disappearance rates of chlorophenols in Canagagigue Creek (Carey et al. 1984) also applies to 2-(methylthio)benzothiazole and benzothiazole.
- River nutrient models and ammonia cycling. To improve the ammonia model for Canagagigue Creek. Subject to regional research needs, the model will be applied to other sites in IWD Western and Northern, and Pacific and Yukon Regions. N-15 work on ammonia cycling will be continued.
- Further work on analysis of taste and odour compounds.

Performance Indicators/Indicateurs de rendement

- Completion of laboratory and field work on benzothiazoles by December 1984 (subject to cooperation of Grand River Conservation Authority). Report by March 1985.
- One manuscript on the ammonia model by March 1985.
- Evaluation of charcoal absorption and open loop stripping methods for analysis of geosmin and 2-methylisoborneol by Dec. 1984.

Relevance/Objet

- Basic information on behaviour of organic contaminants in river systems.
- The ammonia model will be useful in predicting the environmental impact (eutrophication and toxicity) of ammonia inputs to rivers, and the N-15 work will provide further information on the short-term fate of ammonia in polluted systems. Manitoba Environment, and IWD Pacific and Yukon, and Western and Northern Regions have expressed an interest in application of results.
- Taste and odour is a common problem in municipal water supplies in western Canada and along western Lake Ontario.

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Plan d'étude

NO: 84-  
433

STUDY TITLE TITRE D'ETUDE	Microbial Activities in Freshwater Ecosystems		DIVISION AED
KEY WORDS MOTS CLEFS	BACTERIA, ANALYTICAL METHODS, ECOLOGY, MICROBIOLOGY, ENVIRONMENTS AQUATIC, PHYSIOLOGY		SECTION NUPROS
STUDY LEADER/ CHEF D'ETUDE	Burnison, B.K.	TEL: 637-4706	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	D.J. Nuttley		FUNDING SOURCE FINANCEMENT  NWRI
TIME FRAME CALENDRIER	START DEBUT April 1983	FINISH FIN March 1986	
OPERATIONAL CONTACT OPERATIONNEL	Head, WQB - P&YR		TEL: 544-6019

Goals/Buts

The microbial activities found in lakewater will be investigated by determining:

1. The rate at which freshwater aerobic heterotrophic bacteria use organic substrates will be studied using recent modifications to the "heterotrophic potential method".
2.  $^{3}\text{H}$ -Thymidine incorporation into the bacteria will also be used as an index of microbial activity.
3. The metal-binding experiments with isolated fractions of high molecular weight dissolved organic matter (DOM) will be continued.
4. To plan and organize a symposium on Aquatic Microbial Ecology (to be held May 13-15, 1985).

Performance Indicators/Indicateurs de rendement

1. Experiments dealing with the heterotrophic uptake of dissolved organic compounds to be completed by December 1984.
2. Experiments on the incorporation of thymidine into bacterial DNA will be completed by March 1985.
3. Experiments and a report on the metal-binding capacity of high molecular weight organics to be completed by March 1985.
4. Mail brochures, review submitted abstracts, prepare list of papers, mail completed program by February 1985.

Relevance/Objet

A serious gap exists in our knowledge of the role of bacteria in the aquatic environment. The ecological importance of a species of microorganisms is determined by what it does, not by what its name is or by how many will grow on a given medium. Research on methods which can tell us more about the vital role of microorganisms in the aquatic environment must not be neglected. In addition, the role of the organic compounds which they produce must also be investigated. The latter is especially important in view of heavy metal absorption/desorption and mobilization.

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NO: 84-  
436

STUDY TITLE TITRE D'ETUDE	Impact of Organic Colloids on Surface Water Quality	DIVISION AED
KEY WORDS MOTS CLEFS	IMPACT, ORGANICS, BACTERIA, TECHNOLOGY TRANSFER, ALGAE, FIBRILS, SURFACE FILMS, HUMIC ACIDS, HEAVY METALS	SECTION NUPROS
STUDY LEADER/ CHEF D'ETUDE	Leppard, G.G.	TEL: 637-4232 PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	D. Urciuoli, T. Murphy, J. Nriagu, S. Rao (AMD) R. McCrea (IWD-OR), J. Buffel (U. Geneva, Switzerland)	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT March 1984 FIN FIN	March 1985 NWRI
OPERATIONAL CONTACT OPERATIONNEL	R. McCrea, WQB - OR	TEL: 637-4643 INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

To ascertain impacts of organic colloids on the speciation and transport of some high priority trace elements in surface waters. The colloid types emphasized will be fibrils and humic substance aggregates, with the responsibility for isolation, characterization and microscopical monitoring to reside with G. Leppard and D. Urciuoli.

Initially, the trace elements under investigation will be iron, cadmium, aluminum, phosphorus and selenium, with the choice to be narrowed as technical and practical factors dictate. Coordination and write up of biophysical data collections of this study to the related studies of Murphy, Nriagu, Rao, McCrea and Buffel are the responsibility of G. Leppard.

Performance Indicators/Indicateurs de rendement

1. Develop a state-of-the-art document outlining the known impact of aquatic organic colloids, describing current and potential contributions by NWRI and identifying knowledge gaps, May 1984.
2. Collect the results from the integration of this study with the related studies of the team members, March 1985.
3. Provide to collaborators microscopical monitoring of their colloid experiments (April 1984 - March 1985).

Relevance/Objet

This study is directly relevant to the DOE National Programs in Environmental Contaminants, Aquatic Ecology and Eutrophication. Portions of it are being incorporated into LRTAP and IJC projects as well as into studies supported by IWD-OR and IWD-P&YR. International contacts include Prof. Buffel and Prof. Nurnberg (German Nuclear Energy Research Centre). The study assumes that colloid phenomena can significantly modulate water quality by mechanisms not yet delineated, and that knowledge of these mechanisms could be put to direct practical use.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 437
STUDY TITLE TITRE D'ETUDE	Regulating Phytoplankton Coprecipitation of Phosphate with Calcite		DIVISION AED
KEY WORDS MOTS CLEFS	EUTROPHICATION, B.C., NUTRIENTS, AVAILABILITY, ALGAL GROWTH, BIOGEOCHEMISTRY, PRECIPITATION, PHOSPHORUS,		SECTION NUPROS
STUDY LEADER/ CHEF D'ETUDE	Murphy, T.		TEL: 637-4602 PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	G. Leppard, D. Urciuoli, R. Daley, C. Gray K. Hall, U.B.C; C. Bull, Penticton; D. Holmes, Kamloops		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	MARCH 1985 NWRI
OPERATIONAL CONTACT OPERATIONNEL	Head, WQB - P&YR		TEL: 544-6019 INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

For the finalization of Frisken Lake, B.C. experiments:

1. To evaluate the effect of colloidal and dissolved organic substances on calcite stability and phosphate availability.
2. To observe the long term effect of lime application upon phosphate solubility.
3. To determine if an application of lime in late May (two weeks of field time) can prevent the formation of blue-green algal blooms (additional two weeks associated with monitoring).
4. To determine both the immediate and long term effect of lime application upon fish. (Long term monitoring to be done by staff from the DOE-P&YR and MOE-Kamloops and Vancouver.)

#### Performance Indicators/Indicateurs de rendement

1-4. Final report on Frisken Lake experiments by March 1985.

#### Relevance/Objet

In-lake treatments as are needed in areas with naturally high phosphate loading, and in areas where diffuse agricultural nutrient loading cannot be controlled. Local agencies (DOE-P&YR, MOE-Penticton & Kamloops, Chain Lake Lodge) have requested help. Large scale manipulations of lake also provide an excellent opportunity to study phosphate-calcite geochemistry.

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NO: 84-  
438

STUDY TITLE TITRE D'ETUDE	Nutrient Transformations in Lakes/Biosynthesis & Contaminant Inhibition		DIVISION AED
KEY WORDS MOTS CLEFS	NUTRIENTS, EUTROPHICATION, CONTAMINANTS, MICROBIOLOGY PHYTOPLANKTON, GREAT LAKES, PHOSPHORUS		SECTION NUPROS
STUDY LEADER/ CHEF D'ETUDE	Lean, D.R.S.	TEL: 637-4221	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Edmondson, A. Abbott		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1982	FINISH FIN 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	M. Neilson, WQB - OR		TEL: 637-4641
			INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. Relate previously developed indices for P-limitation to techniques available for surveillance.
2. Initiate field experiments on a variety of lakes on the interrelationships of phosphorus enrichment on assimilation of nitrate and sulphate.
3. Conduct experiments evaluating the significance of picoplankton ( $0.2 - 2.0\mu$ ) on lake metabolism.
4. Conduct experiments on the nutritional requirements of cold water plankton (under ice).
5. In collaboration with University of Guelph, determine interactions between nutrient loading and detoxification of selected pesticides and herbicides which will be added to enclosures at Lake St. George.

Performance Indicators/Indicateurs de rendement

1. Report recommending new surveillance technique by March 1985.
2. Preliminary experiments will be completed in March 1985.
3. Publications on significance of picoplankton to be prepared prior to March 1985.
4. Experiments on nutrient demand, protein vs carbohydrate synthesis to be completed by March 1985.
5. Preliminary experiments completed by October 1984. Publications to be submitted by March 1985.

Relevance/Objet

Directly relevant to surveillance and lake monitoring, acid rain, to lake metabolic processes and interrelationships between nutritional state and contaminants is poorly understood. To provide advanced and revised knowledge for efficient water quality management (IWD Regions, LRTAP, MOE).

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NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Milfoil Control	DIVISION AED	
KEY WORDS MOTS CLEFS	WEEDS, ECOLOGY, EURASIAN WATERMILFOIL, AQUATIC MACROPHYTES, GREAT LAKES, REHABILITATION, SEDIMENTS	SECTION GRLRHS	
STUDY LEADER/ CHEF D'ETUDE	Painter, S.	TEL: 637-4602 PAE EAP 1532	
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Wood	FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT 1980	FINISH FIN March 1985	NWRI IWD
OPERATIONAL CONTACT OPERATIONNEL	V.G. Bartnik, WP&M - P&YR	TEL: 666-1404 <u>INTEREST/INTERET DIRECT-GENERAL</u>	

Goals/Buts

1. To develop an ecologically sound method of control for Eurasian watermilfoil.
2. To investigate the possible mechanisms behind the milfoil decline in Ontario.
3. To determine what conditions, if any, are stopping macrophyte community from growing. The two ministries (OMOE, OMNR) want to restore the macrophyte community to stabilize the sediment to reduce the turbidity and restore the fishery.

Performance Indicators/Indicateurs de rendement

1. a) Harvest Buckhorn plot in June and October 1984  
b) Monitor the effect on macrophyte regrowth and sediment chemistry and report on 1984 results by February 1985.
2. Issue contract to investigate possible mechanisms of decline of milfoil.
3. Conduct growth experiments to determine if sediment and ambient conditions are capable of supporting growth, May to February 1985.

Relevance/Objet

Nuisance aquatic macrophytes are managed by several provincial and federal agencies. This program is designed to provide research support for intelligent management decisions. Rondeau Bay, a nearshore area of Lake Erie, is an important warm water fishery on Lake Erie and the provincial ministries of Environment and Natural Resources are investigating ways of restoring the resource and have sought our support.

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STUDY TITLE TITRE D'ETUDE	Rondeau Bay Rehabilitation and Watershed Study		DIVISION AED
KEY WORDS MOTS CLEFS	GREAT LAKES, REHABILITATION, AQUATIC MACROPHYTES, WATER QUALITY, SEDIMENTS, NEARSHORE PROCESSES		SECTION GRLRHS
STUDY LEADER/ CHEF D'ETUDE	Painter, S.	TEL: 637-4602	PAE EAP 1532
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Wood		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1987	
OPERATIONAL CONTACT OPERATIONNEL	B.G. Bartnik, WP&M - P&YR		TEL: 666-1404

Goals/Buts

To determine what conditions, if any, are stopping macrophyte community from growing in Rondeau Bay. The two ministries (OMOE, OMNR) want to restore the macrophyte community to stabilize the sediment to reduce the turbidity and restore the fishery.

1. Conduct growth experiments to find whether macrophytes can grow in Rondeau Bay sediments.
2. Interpret results and write report and recommendations.
3. To evaluate the Rondeau Bay watershed as a possible case study to illustrate the impact of soil practices on water quality in the receiving waters (subject to GLWQP funding).

Performance Indicators/Indicateurs de rendement

Conduct growth experiments to determine if sediment and ambient conditions are capable of supporting growth.

1. Let contract to assemble information and begin growth experiments by Maryc 1, 1984.
2. Report on experiments to find whether sediments are capable of supporting macrophyte growth by April 1985.
3. Illustrate the impact of soil conservation measures on the water quality of Rondeau Bay and the subsequent loading to Lake Erie by June 1985 (subject to GLWQP funding)

Relevance/Objet

Rondeau Bay, a nearshore area, is an important warm water fishery on Lake Erie and the provincial ministries of Environment and Natural Resources are investigating ways of restoring the resource and have sought our support.

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NO: 84-  
494

STUDY TITLE TITRE D'ETUDE	Influence of Coastal Upwelling on Algal Growth	DIVISION AED
KEY WORDS MOTS CLEFS	NUTRIENTS, CURRENTS, THERMODYNAMICS, WATER, ALGAL GROWTH, EUTROPHICATION, PHYTOPLANKTON, LAKE ONTARIO	SECTION NUPROS
STUDY LEADER/ CHEF D'ETUDE	Lean, D.R.S.	TEL: 637-4221 PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Simons, A. Abbott	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984 FIN FIN	MARCH 1985 NWRI GLWQA
OPERATIONAL CONTACT OPERATIONNEL	M. Neilson, WQB - OR	TEL: 637-4641 INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. Establish correlations between the dynamics and thermodynamics of water masses (Simons) and the structure of the plankton community related to phosphorus concentrations (1982 data).
2. Carry out experiments on phosphorus availability related to the upwelling of water along the north shore of Lake Ontario. Cold nutrient-rich water moves westerly. The dimensions of this "stream" will be monitored and time scales of nutrient uptake and phytoplankton growth will be monitored.

Performance Indicators/Indicateurs de rendement

1. Develop predictive relationship between upwelling nutrients and algal response. Progress report by March 1985.
2. Conduct lake experiments on Limnos (2 cruises) in July and August 1984.

Relevance/Objet

This project attempts to link the 1982-83 Lake Ontario Nutrient Assessment Study (LONAS) with the lake physics studies of the same year (APSD 83-502, 503). It is important to recognize that upwelled water moves along the coast in a westerly direction. This means that inputs are transported from city to city rather than mixing with the lake. This is a joint project with PSD but contributions from contaminants and microbiology are welcome.

STUDY TITLE TITRE D'ETUDE	Sediment Bank - Great Lakes		DIVISION AED		
KEY WORDS MOTS CLEFS	SEDIMENTS, GREAT LAKES, TRENDS, CONTAMINANTS, DATA HISTORICAL, PERSISTENCE, POLLUTION, WATER QUALITY		SECTION EMPACS		
STUDY LEADER/ CHEF D'ETUDE	Bourbonniere, R.A.	TEL: 637-4547	PAE 1514 EAP		
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	FY 79/80	FINISH FIN	30 Sept. 1984	NWRI
OPERATIONAL CONTACT OPERATIONNEL	B.K. Afghan, NWQL		TEL: 637-4661	INTEREST/INTERET <u>DIRECT</u> -GENERAL	

#### Goals/Buts

To establish a bank of Great Lakes sediment samples to permit retroactive analysis in order to establish spatial and temporal trends.

1. Complete sample processing and cataloguing of samples already collected in four of the Great Lakes by September 1984.
2. Determine bulk parameters as required to complete and update data bank.
3. Update catalogue for Lakes Erie and Superior samples by September 1984.
4. Prepare guidelines for the use of Sediment Bank samples (management policy statement).

#### Performance Indicators/Indicateurs de rendement

1. Preservation study complete by September 1984.
2. Data bank updated by September 1984.
- 3-4. Policy statement submitted for publication by September 1984.

#### Relevance/Objet

The Sediment Bank fulfills, in part, requirements under Annex 12, Section 4(a) and 5(e) of the GLWQA. This study continued for four years collecting sediment from Lakes Huron (1980), Ontario (1981), Erie (1982) and Superior (1983). It will take about half a year to wrap up all of the work and get the Bank ready to operate.

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STUDY TITLE TITRE D'ETUDE	Lake Erie Surveillance Continuity		DIVISION AED
KEY WORDS MOTS CLEFS	ALGAE, DECOMPOSITION, EUTROPHICATION, LAKE ERIE, METHODS DEVELOPMENT, OXYGEN, PROFILING SYSTEM,		SECTION GRLRHS
STUDY LEADER/ CHEF D'ETUDE	Charlton, M.N.	TEL: 637-4220	PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	J.S. Ford, S.S. Rao		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1986	GLWQA NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Williams, IWD - OR		TEL: 637-4531

Goals/Buts

1. Complete development of successful prototype constructed for 1983/84.
2. Extend profiling capability to pH, conductivity and turbidity.
3. Deploy extended system June 1 - September 30, 1984, Lake Erie.
4. Count algae and bacteria in zones of local oxygen depletion in thermoclines to correlate biological and chemical indicators of eutrophication.
5. Transmit all data to CYBER STAR system as standard surveillance data for further use and report on findings.
6. Technology transfer to TOD.

Performance Indicators/Indicateurs de rendement

1. Replace outdated and damaged parts, complete programming for surveillance mode, construct calibration bath by June 1984.
2. Construct backup sonde with spare parts and add pH, conductivity turbidity channels by July 1984.
3. Use system on 6-8 cruises at 15 stations during the stratified season on L. Erie by November 1984.
4. Provide report on microbiota associated with local oxygen depletion by March 1985.
5. Produce provisional listings from STAR system which appear as ordinary surveillance data by March 1985.
6. Introduce system to TOD maintenance personnel by March 1985.

Relevance/Objet

Applies to IJC recommendation to monitor chemical and biological response of lakes to loading abatement as specified by GLWQA of 1978.

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NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Cladophora Management in Lake Ontario		DIVISION AED
KEY WORDS MOTS CLEFS	GREAT LAKES, WATER QUALITY, PHOSPHORUS, NEARSHORE, AQUATIC MACROPHYTES, CLADOPHORA, COASTAL ZONE		SECTION GRLRHS
STUDY LEADER/ CHEF D'ETUDE	Painter, S.		TEL: 637-4602 PAE EAP 1514
TEAM MEMBERS/ MEMBRES D'EQUIPE	M. Charlton		FUNDING SOURCE FINANCEMENT  GLWQA NWRI
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	
OPERATIONAL CONTACT OPERATIONNEL	R. Kalinauskas, WP&M - OR		TEL: 637-4321 INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To determine if Cladophora can be managed in Lake Ontario by phosphorus reduction schemes.
2. To measure and characterize the physical and chemical environment in areas of Cladophora growth.

Performance Indicators/Indicateurs de rendement

1. a) Gather relevant information on landing, mixing and nearshore-offshore interactions in Lake Ontario by December 1984.  
b) Model Cladophora's response to hypothetical nearshore conditions by March 1985.
2. Sample 2 sites weekly, May to September 1984, for physical and chemical ecology parameters such as nutrients, turbidity and temperature, light extinction, and secchi depth. The stations will be similar to stations chosen by J. Simons (APSD) who is measuring currents and temperature patterns in the nearshore area from Burlington to Cobourg.

Relevance/Objet

The nearshore environment is of immediate concern to the public and GLWQA. Cladophora's presence is disturbing the public's perception of L. Ontario's water quality in general. This is relevant to DOE's Ontario Regional Director General's GLWQP.

AQUATIC PHYSICS & SYSTEMS DIVISION



### Aquatic Physics and Systems Division

The Aquatic Physics and Systems Division of the National Water Research Institute conducts a program of research involving experimental measurements, environmental modelling via numerical simulation, and theoretical studies. All of this work is directed towards the goal of understanding the interrelationship of fluxes of dissolved and suspended materials and water movements due to physical processes such as circulation, turbulent mixing and convection, transmission and scattering of light. It is difficult, if not impossible, to interpret biochemical measurements in large lakes without an adequate knowledge of the physical processes acting at the time.

These responsibilities are shared among four sections: 1) Physical Limnology, 2) Environmental Simulation, 3) Environmental Optics, and 4) Data Management. The last section is service-oriented and provides computer programming and data management service to the National Water Research Institute.



## STUDIES FOR AQUATIC PHYSICS AND SYSTEMS DIVISION

SECTION	STUDY	STUDY TITLE	STUDY LEADER	B4/05/01.
DIVISION	500	AQUATIC PHYSICS AND SYSTEMS DIVISION ADMINISTRATION	ELDER, F.C.	
	508	COORDINATION OF IWD LRTP PROGRAM	ELDER, F.C.	
ENVIRONMENTAL SIMULATION	501	WATER QUALITY, POLLUTANT TRANSPORT AND THERMODYNAMIC MODELS	SIMONS, T.J.	
	502	COASTAL ZONE CONTAMINANTS AND RADIONUCLIDES TRANSPORT MODEL	LAM, D.C.L.	
	503	HYDRODYNAMIC MODELS OF LAKES IN RELATION TO EUTROPHICATION	SIMONS, T.J.	
	504	ENVIRONMENTAL MODELS OF TOXICITY OF CONTAMINANTS	HALFON, E.	
	505	ENVIRONMENTAL SIMULATION/STATISTICAL ANALYSIS	EL-SHARAWI, A.H.	
	506	AQUATIC REGIME ACIDIFICATION MODELS AND MONITORING	THOMPSON, M.E.	
	507	WATERSHED ACIDIFICATION MODELS	LAM, D.C.L.	
	509	MODELLING CLIMATIC VARIATIONS OF AIR-WATER EXCHANGES	SCHERTZER, W.M.	
	514	NIAGARA RIVER PLUME	MURTHY, C.R.	
PHYSICAL LIMNOLOGY	510	DEVELOPMENT OF INSTRUMENTATION FOR PHYSICAL LIMNOLOGY	BULL, J.A.	
	511	SYNTHESIS REPORT OF 1979 AND 1980 LAKE EXPERIMENTS	BOYCE, F.M.	
	512	CIRCULATION WITHIN GREAT LAKES COASTAL ZONES	BOYCE, F.M. & MURTHY, C.R.	
	513	PRESNTATION AND INTERPRETATION OF GREAT LAKES PHYSICAL DATA	BOYCE, F.M.	
	515	WATER QUALITY SIMULATION FOR ICE-COVERED LAKES AND RESERVOIRS	HAMBLIN, P.F.	
ENVIRONMENTAL SPECTRO-OPTICS	540	APPLICATION OF OPTICAL MEASUREMENTS TO LAKE RESEARCH	BUKATA, R.P.	
DATA MANAGEMENT	571	CCIW DATA ARCHIVING	NAGEL, W.	
	572	WATER QUALITY DATA BASE ADMINISTRATION	DUFFIELD, R.	
	573	EDP SUPPORT - DATA MANAGEMENT	COMBA, H.	
	574	GRAPHICS AND MICROCOMPUTER NETWORKING	BEAL, G.S.	
	575	GEMS/UNEP - GLOBAL WATER QUALITY DATA MANAGEMENT	DUFFIELD, R.	







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NO: 84- 500

STUDY TITLE TITRE D'ETUDE	Aquatic Physics and Systems Division Administration			DIVISION APSD
KEY WORDS MOTS CLEFS	AQUATIC PHYSICS, SYSTEMS ANALYSIS, MODELS, ADMINISTRATION, MANAGEMENT			SECTION APSDIV
STUDY LEADER/ CHEF D'ETUDE	Elder, F.C.	TEL: 637-4212		PAE 1512 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	S.M. Tapping			FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To develop the research program plan of APSD.
2. To develop a personnel utilization plan for APSD.
3. To develop a personnel training plan for APSD.
4. To develop a financial budget for APSD.
5. To manage and control the program of APSD.

Performance Indicators/Indicateurs de rendement

1. Research program plan developed on schedule.
2. Personnel utilization plan developed within allocations and schedule.
3. Personnel training plan developed within budget and on schedule.
4. Financial plan for APSD developed within allocation.
5. Program plan of APSD carried out, evaluated and reported as per the operation directives of the Institute.

Relevance/Objet

The APSD provides the physical limnology, environmental optics, environmental simulation and data management contributions to the NWRI program plan.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
501

STUDY TITLE TITRE D'ETUDE	Water Quality, Pollutant Transport and Thermodynamic Models		DIVISION APSD
KEY WORDS MOTS CLEFS	ENVIRONMENTAL SIMULATION, GREAT LAKES, POLLUTANT TRANSPORT, RADIOACTIVITY, CLIMATE, MODELS		SECTION ENVSIM
STUDY LEADER/ CHEF D'ETUDE	Simons, T.J.	TEL: 637-4218	PAE EAP 1512
TEAM MEMBERS/ MEMBRES D'EQUIPE	D.C.L. Lam and W.M. Schertzer		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1982	FINISH FIN 1987	NWRI
OPERATIONAL CONTACT OPERATIONNEL	R. Stevens, WQB - OR		TEL: 637-4641
			INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

To implement the operational use of models in environmental management, to assess the outcome of proposed control strategies by recourse to available models, and to upgrade such models by integrating new research results and field data as they become available by:

- a) Consultation with IWD-OR on operational application of a Lake Ontario eutrophication model.
- b) Implementation of an operational model to predict the movement of accidental radioactive spills at the Pickering power plant with reference to effects on nearby municipal water intakes.
- c) Consultation with the Canadian Climate Centre (CCC) in further studies with the coupled ocean-atmosphere model developed by NWRI and AES.

Performance Indicators/Indicateurs de rendement

- a. Consultation to be provided to IWD-OR in operational use of the Lake Ontario Model as requested.
- b. An operational model for computing the movement of radioactive spills along the northwest shore of Lake Ontario to be available by July 1984.
- c. Consultation to be provided with the CCC in terms of the ocean-atmosphere model.

Relevance/Objet

Operational versions of the best available research models are required to assess effects of proposed water management strategies for the Great Lakes. The Emergency Task Force (MOE) that is concerned with accidental radioactive spills from Ontario's nuclear power plant requires a contaminant transport model. The Lake Erie oxygen depletion model may be extended in time to provide further information on the anoxia in relation to fisheries effects and lake management options.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
502

STUDY TITLE TITRE D'ETUDE	Coastal Zone Contaminants and Radionuclides Transport Model		DIVISION APSD
KEY WORDS MOTS CLEFS	RADIOACTIVITY, CONTAMINANTS TRANSPORT, LAKE ONTARIO, SEDIMENTS, ENVIRONMENTAL SIMULATION, MODELS		SECTION ENVSIM
STUDY LEADER/ CHEF D'ETUDE	Lam, D.C.L.	TEL: 637-4241	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.G. Bobba, C.R. Murthy, E. Halfon, R.F. Platford (ECD) and R.A. Bourbonniere (AED), K. Kaiser (ECD)		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1983	FINISH FIN 1987	NWRI TCMP
OPERATIONAL CONTACT OPERATIONNEL	M. Sydor, WP&M - HQ		TEL: 997-2359
INTEREST/INTERET <u>DIRECT</u> -GENERAL			

Goals/Buts

1. To verify the transport model for radionuclides (uranium, radium) with data sampled from the subsurface strata, porous media and lake water at the Port Granby disposal site, Lake Ontario (related to ECD study 241).
2. To improve the tritium ( $H^{3+}$ ) spill model and adapt it to other radionuclides and contaminants emitted from power plants and chemical dumpsites (related to APSD studies 501 and 514).
3. To derive the contaminant levels in the sediment from observed data (Ra-226, Pb-210, geolipids) by using the sediment transport model and pinpoint the effects of sedimentation loads, resuspensions, bioperturbation, sorption and diffusion (related to AED study 419).

Performance Indicators/Indicateurs de rendement

1. A report on the pathway of radionuclides through the porous media, sediment and lake water at the Port Granby disposal site will be completed by December 1984.
2. The upgrade on the  $H^{3+}$  spill model will be completed by March 1985.
3. A report on the progress of the sediment contaminant model will be completed by March 1985.
4. Further application of these models to water intake systems will be carried out pending GLWQP funding.

Relevance/Objet

Models of the pathway transfer of radionuclides and other contaminants are essential to permit generalization from the experimental data at a particular site. Assessment using simulation results are crucial for the identification of the effects of leakage at nuclear power plants, chemical mines, waste dumpsites and lake sediments. Goals 1 and 2 form part of a proposal to the GLWQP.

Study results are of use to TCMP, EPS Ontario Region, and Ontario Ministry of Environment and IWD Ontario Region.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
503

STUDY TITLE TITRE D'ETUDE	Hydrodynamic Models of Lakes in Relation to Eutrophication	DIVISION APSD
KEY WORDS MOTS CLEFS	CIRCULATION MODELS, ENVIRONMENTAL SIMULATION, LAKE ONTARIO, CURRENTS, NUTRIENTS	SECTION ENVSIM
STUDY LEADER/ CHEF D'ETUDE	Simons, T.J.	TEL: 637-4218 PAE EAP 1512
TEAM MEMBERS/ MEMBRES D'EQUIPE	W.M. Schertzer, E. Halfon, (D. Lean - AED)	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1982	FINISH FIN 1987
OPERATIONAL CONTACT OPERATIONNEL	M. Neilson, WQB - OR	TEL: 637-4641 NWRI INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. To simulate the hydrodynamics of large lakes under homogeneous and stratified conditions by recourse to observations in Lake Ontario during the summer of 1982 and the winter of 1982/83.
2. To use spectral techniques and modeling methods to explain current reversals and temperature oscillations in the nearshore zone with special reference to the north shore of Lake Ontario.
3. To establish the dynamical and thermodynamical framework for an improved eutrophication model of Lake Ontario to be developed in cooperation with the nutrient dynamics studies of AED.
4. To analyze phosphorus cycling data collected in LONAS in 1982 in cooperation with D. Lean (AED) using systems methods and produce a numerical model of phosphorus cycling.

Performance Indicators/Indicateurs de rendement

1. A report summarizing the analysis of the data from the 1982/83 Lake Ontario field program will be prepared before the end of the year.
- 2-3. An improved eutrophication model for Lake Ontario to be developed in preliminary form by March 1985.
4. A system model of phosphorus cycling in Lake Ontario to be developed by March 1985.

Relevance/Objet

Knowledge of water movements is a prerequisite for computing contaminant transport and effects of nutrient supply on water quality parameters of large lakes. These transports may be combined in interactive models to relate the nutrient control to water quality of the lakes.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
504

STUDY TITLE TITRE D'ETUDE	Environmental Models of Toxicity of Contaminants			DIVISION APSD
KEY WORDS MOTS CLEFS	MODELS, LAKE ONTARIO, CHEMISTRY, TOXICITY, ENVIRONMENTAL SIMULATION			SECTION ENVSIM
STUDY LEADER/ CHEF D'ETUDE	Halfon, E.		TEL: 637-4243	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Kaiser (ECD)			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	March 1985	NWRI TCMP
OPERATIONAL CONTACT OPERATIONNEL	D. Valiela, WQB - P&YR		TEL: 666-6038	INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. To perform a literature search on the problem of Quantitative Structure Activity Relationships (QSAR) and modeling effort status in the field.
2. To perform statistical analysis (cluster analysis, major factor analysis, etc) on available data relating chemical structure to toxicity.
3. To utilize the available information in a systems analysis development of a chemical structure - toxicity model.
4. To evaluate the limits of extrapolating the model to other compounds.

Performance Indicators/Indicateurs de rendement

1. A literature review to be completed by May 1984.
2. A statistical analysis of existing data to be completed by July 1984 or pending availability of the data.
3. A preliminary chemical structure - toxicity model to be in draft form by January 1985.
4. An assessment of the potential to transfer the model to other compounds completed by March 1985.

Relevance/Objet

The systems approach provides a method to consider together many different chemical, physical and structural properties of a contaminant to predict possible toxic effects in the environment. This analysis of laboratory data will produce sub-models that will be included in future modelling efforts to predict the fate and effects of toxic substances in the environment. The ability to model the toxicity of compounds based on chemical structure is an essential element of control of toxic contaminants.

Study results are relevant to TCMP and DOE Ontario Regional Director General's Office.

STUDY TITLE TITRE D'ETUDE	Environmental Simulation/Statistical Analysis		DIVISION APSD
KEY WORDS MOTS CLEFS	TRENDS, DETECTION LIMITS, NIAGARA RIVER, TOXIC CONTAMINANTS, TRACE METALS, TRUNCATED DATA		SECTION ENVSIM
STUDY LEADER/ CHEF D'ETUDE	El-Shaarawi, A.H.	TEL: 637-4584	PAE EAP 1113
TEAM MEMBERS/ MEMBRES D'EQUIPE	S. Esterby, D. Warry, K. Kuntz, M. Neilson, WQB - OR, M. Whittle, GLFRB		FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT 1984	FINISH FIN 1987	
OPERATIONAL CONTACT OPERATIONNEL	P. Whitfield, WQB - P&YR		TEL: 666-6038
			INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. To continue developmental work on the statistical model relating to seasonal cycles of pH, TP, Alk, NO<sub>3</sub> for the Niagara and St. Lawrence Rivers.
2. To develop statistical techniques for the analysis of truncated data including the estimation of model parameters, the testing of limnological hypotheses and the testing of the model accuracy, using the Niagara River contaminant data where possible.
3. Statistical evaluation of the Bioindex Surveillance data base for Chl<sup>a</sup>, P, Tn, Cl and other selected parameters (dependant on GLWQP support).

#### Performance Indicators/Indicateurs de rendement

1. A report on Niagara and St. Lawrence rivers interactive relationships by March 1985.
2. Report on the truncated data methodology with possible application to parameters such as Cd, Hg, and PCBs by March 1985.
3. Pending on approval of a GLWQP grant, a report on surveillance design based on analysis of Bioindex Data will be completed by March 1985.

#### Relevance/Objet

Substantial portion of the toxic substances surveillance data in Niagara River and other water bodies are reported as below detection. Elimination or arbitrary assignment of values for these data creates biases in trend analysis. This study proposes to develop new and statistically sound methods to avoid such biases. The application of truncated data methodology is important in estimating the contaminant loadings from Niagara River to Lake Ontario.

The Bioindex Surveillance program provides a proposed alternate to the existing surveillance methodologies. A statistical assessment of the early results indicate the relative merits of the two approaches to Great Lakes Surveillance.

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Plan d'étude

NO: 84-  
506

STUDY TITLE TITRE D'ETUDE	Aquatic Regime Acidification Models and Monitoring		DIVISION APSD
KEY WORDS MOTS CLEFS	SULFUR, LRTAP, ACID RAIN, MODELS, ACID LAKES		SECTION ENVSIM
STUDY LEADER/ CHEF D'ETUDE	Thompson, M.E.	TEL: 637-4513	PAE EAP 4200
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.S. Fraser		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1979	FINISH FIN 1989	
OPERATIONAL CONTACT OPERATIONNEL	T. Pollock, WQB - AR	TEL: 388-6606	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. To continue to validate the Cation Denudation Rate (CDR) model (in non-organic waters) as more data become available from the monitoring programs.
2. To develop sound estimates of natural background levels of sulfate deposition and to demonstrate aquatic systems effects at deposition rates above target ( $20 \text{ kg ha}^{-1} \text{ yr}^{-1}$ ). This study to be coordinated with Atmospheric Env. Service (J. Young).
3. To develop quantitative statements of the proportions of resources at risk at various deposition rates.

Performance Indicators/Indicateurs de rendement

1. CDRs to be recalculated as more data become available (via the monitoring program), and "constancy" of CDRs to be assessed (MET).
2. Reports on summaries of evidence of sulfate deposition and of effects using sulfate isotope and concentration data to be produced in 1984.
3. To complete preliminary assessment of resources at risk for the Quebec and Atlantic Regions by March 1985.

Relevance/Objet

The DOE Strategic Plan ranks acid rain as the second in priority of all Departmental programs. The items included in this study relate directly to development and further verification of the CDR model that is presently applied to estimate target loadings of  $\text{SO}_4$  under the Canada-United States MOI. A memorandum from the DM to member SMC list acid rain among items of Absolute Priority.

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Study Plan  
Plan d'étude

NO: 84-  
507

STUDY TITLE TITRE D'ETUDE	Watershed Acidification Models	DIVISION APSD
KEY WORDS MOTS CLEFS	ACID RAIN, ENVIRONMENTAL SIMULATION, LRTAP, MODELS	SECTION ENVSIM
STUDY LEADER/ CHEF D'ETUDE	Lam, D.C.L.	TEL: 637-4241 PAE EAP 4200
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.G. Bobba, D. Jeffries, M. Thompson, F.C. Elder	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1982	FINISH FIN 1987
OPERATIONAL CONTACT OPERATIONNEL	T.A. Clair, WQB - AR	TEL: 388-6606 NWRI LRTAP INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. To integrate the Turkey Lakes Watershed data (1980-83), to define the pathways leading to surface or groundwater systems and to calibrate known chemical equilibrium equations in aquatic regimes, particularly on the carbon and sulphate cycles.
2. To continue development of hydro-geochemical acidification and water quality model components affecting the pH, alkalinity and major ions; inclusion of atmospheric loads and rainfall-runoff sub-models; feedbacks to experimental projects conducted by ECD and other agencies.
3. Preliminary validation of the model with data from other watersheds.

Performance Indicators/Indicateurs de rendement

1. A report on the Turkey Lakes Watershed model to be completed by January 1985.
2. A report on the effects of acid loads by March 1985.
3. Work on available data from other watersheds should start during 1984/85.

Relevance/Objet

The primary requirement of the Canada - U.S. Memorandum of Intent concerning Transboundary Air Pollution is the specification of ecosystem tolerance and response to LRTAP stresses. The modelling efforts are necessary to synthesize the information into comprehensive regime response simulation. This model synthesis is necessary to provide the needed linkage of LRTAP stress and aquatic regime response in a basin systems scale.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 508
STUDY TITLE TITRE D'ETUDE	Coordination of IWD LRTAP Program		DIVISION APSD
KEY WORDS MOTS CLEFS	ACID RAIN, LRTAP, COORDINATION		SECTION APSDIV
STUDY LEADER/ CHEF D'ETUDE	Elder, F.C.	TEL: 637-4212	PAE EAP 4200
TEAM MEMBERS/ MEMBRES D'EQUIPE	IWD Managers in the LRTAP Program, NWRI, NHRI, WQB, WRB		FUNDING SOURCE FINANCEMENT  NWRI LRTAP
TIME FRAME CALENDRIER	START DEBUT 1979	FINISH FIN 1989	
OPERATIONAL CONTACT OPERATIONNEL	L.J. Zeman, WQB - AR		TEL: 666-6038

#### Goals/Buts

1. To coordinate the IWD LRTAP program under the framework of the DOE and ECS LRTAP program plans and develop the FY 85-86 IWD LRTAP plans.
2. To monitor the progress and status of the IWD LRTAP program.
3. To represent IWD on the ECS LRTAP Committee and to provide IWD information to the DOE and Federal/Provincial LRTAP Committees and work groups.
4. To provide information flow from the IWD LRTAP program to the MOI or other International negotiating bodies.

#### Performance Indicators/Indicateurs de rendement

- 1a) The IWD long-range operational plan for LRTAP to be updated by November 1984.
- b) The IWD LRTAP operational plan to be completed for FY 85-86 by February 1985.
2. Progress and status reports to be submitted to the DG at six month intervals.
3. IWD LRTAP program to be represented as required.
4. Information from the IWD program to be available to the MOI as required.

#### Relevance/Objet

The Acid Rain program is given a priority two of all Departmental programs in the DOE Strategic Plan. The ECS Strategic Plan also places high priority on the LRTAP program. The IWD program is a vital component of the ECS and DOE LRTAP programs.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 509		
STUDY TITLE TITRE D'ETUDE	Modelling Climatic Variations of Air-Water Exchanges		DIVISION APSD		
KEY WORDS MOTS CLEFS	CLIMATE, MODELS, AIR-WATER INTERACTION, HEAT BUDGETS, TEMPERATURE, WIND, THERMODYNAMICS		SECTION ENVSIM		
STUDY LEADER/ CHEF D'ETUDE	Schertzer, W.M.	TEL: 637-4218	PAE EAP 1512		
TEAM MEMBERS/ MEMBRES D'EQUIPE	Contract		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	April 1984	FINISH FIN	March 1985	CCP NWRI
OPERATIONAL CONTACT OPERATIONNEL	M. Quast, WRB - HQ		TEL: 997-1535	INTEREST/INTERET <u>DIRECT-GENERAL</u>	

#### Goals/Buts

Improve the physical basis and update numerical models for computing long-term variations of the energy balance at the air-water interface.

#### Work Plan

Data acquisition, specifically climatic records of wind, radiation and atmospheric and aquatic temperatures. Development of improved models for the energy balance at the air-water interface and comparison with available heat budgets.  
(Research contract with McMaster University, Geography Department).

#### Performance Indicators/Indicateurs de rendement

Report by March 31, 1985.

#### Relevance/Objet

1. One of the major objectives of CCP is to develop a coupled atmosphere-ocean circulation model for climatic time scales. Development and verification of the air-water exchange component of the model is handicapped by deficiency of oceanic data but can be accomplished by recourse to the extensive data base available for the Great Lakes.
2. Climatic variations of the surface energy balance and the thermal structure will alter nutrient fluxes, oxygen conditions and primary production of water bodies. Combining climatic data, thermodynamic models and sediment chemistry data may lead to understanding water quality responses to climatic variations.

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Study Plan  
Plan d'étude

NO: 84-  
510

STUDY TITLE TITRE D'ETUDE	Development of Instrumentation for Physical Limnology			DIVISION APSLD
KEY WORDS MOTS CLEFS	PHYSICAL LIMNOLOGY, INSTRUMENTATION, GREAT LAKES, LAKE ONTARIO, CURRENTS, MIXING			SECTION PHYSLIM
STUDY LEADER/ CHEF D'ETUDE	Bull, J.A.	TEL: 637-4235		PAE EAP 1512
TEAM MEMBERS/ MEMBRES D'EQUIPE	P. Hamblin, C.R. Murthy, F.M. Boyce, K Miners F. Chiocchio			FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	
OPERATIONAL CONTACT OPERATIONNEL	Head, WQB - P&YR			TEL: 544-6019 <u>INTEREST/INTERET DIRECT-GENERAL</u>

Goals/Buts

To develop and evaluate instrumentation for physical limnology in the Great Lakes and other regions of Canada.

1. GVAPS - To consult with Engineering and Technical Operations on improvements to the sea worthiness of the General Vertical Automatic Profiling System. To consult with non-physical scientists concerning the use of the vehicle to carry dissolved oxygen sensors etc. and to integrate these requirements into the system specifications. To plan for and to assist with the execution of a field test of the system in the autumn of 1984. To evaluate the results of this field test plus anterior test (Hamilton Harbour, north shore of Lake Ontario). To write a system manual and final report.
2. CATS - To provide specifications to Engineers based on evaluation of the current and temperature system tested in 1983. To assist with the construction of a second CATS system. To field test the new system in the autumn of 1984.

Performance Indicators/Indicateurs de rendement

1. GVAPS modified specifications by August 1984. Field test by October 1984. Analysis of field data by January 1985. Systems manual and final report by April 1985.
2. Specification of new system by May 1984. New system constructed by September, 1984. Field test by October 1984. Report and system manual by April 1985.

Relevance/Objet

GVAPS and CATS are designed to extend knowledge of vertical distribution of horizontal currents in lakes and estuaries. Information is applied to improve parameterization of turbulent mixing in numerical models. GVAPS has wide applicability because of its capacity to carry biochemical sensors. CATS provides information on currents in shallow water inaccessible to conventional current meters.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 511
STUDY TITLE TITRE D'ETUDE	Synthesis Report of 1979 and 1980 Lake Erie Experiments		DIVISION APSD
KEY WORDS MOTS CLEFS	LIMNOLOGY, LAKE ERIE, GREAT LAKES		SECTION PHYSLIM
STUDY LEADER/ CHEF D'ETUDE	Boyce, F.M.		TEL: 637-4277 PAE EAP 1512
TEAM MEMBERS/ MEMBRES D'EQUIPE	M.N. Charlton, C.H. Mortimer (contract)		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1980	FINISH FIN September 1984	NWRI
OPERATIONAL CONTACT OPERATIONNEL	A. Demayo, WQB - HQ		TEL: 997-1920 INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

To compile edit and publish a synthesis of the principal results of the 1979 and 1980 Lake Erie experiments as a special issue of the Journal of Great Lakes Research.

#### Performance Indicators/Indicateurs de rendement

1. Complete individual papers according to the table of contents put forward by the editorial committee (Mortimer, Boyce, Charlton).
2. Edit submitted manuscripts from other participants (GLERL, CLEAR).
3. Submit edited copy (camera ready) to the Journal of Great Lakes Research by August 1, 1984.

#### Relevance/Objet

1979 and 1980 experiments produced much data on the interaction between physical and biochemical processes in Lake Erie. The Synthesis Report will describe these interactions for the benefit of water management decision-makers and will provide a permanent published record of this extensive investigation of Lake Erie. The report will contain recommendations for future research. Relevant to IJC concerns 106, 216, 207, 201, 319, 307.

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Study Plan  
Plan d'étude

NO: 84-  
512

STUDY TITLE TITRE D'ETUDE	Circulation within Great Lakes Coastal Zones			DIVISION APSD
KEY WORDS MOTS CLEFS	CLIMATE, LIMNOLOGY, COASTAL ZONE, CIRCULATION, GREAT LAKES, LAKE ONTARIO, CURRENTS, ENERGY			SECTION PHYSLIM
STUDY LEADER/ CHEF D'ETUDE	Boyce, F.M. and C.R. Murthy		TEL: 637-4277	PAE EAP 1512
TEAM MEMBERS/ MEMBRES D'EQUIPE	P. Hamblin, T.J. Simons, L. Royer (PDF), J. Bull, K. Miners, F. Chiocchio			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	1983	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	Head, WQB - OR		TEL: 637-4663	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To analyse and report on special data collected in the 1982 experiment on the north shore of Lake Ontario (GVAPS and MCATS).
2. To investigate the relationship between local alongshore water surface slope and alongshore currents on the north shore of Lake Ontario.
3. To install thermistor chains and current meters along the north shore of Lake Ontario from June through August, 1984 in support of AED 494 (upwelling experiment). To process resulting data to scientific form.
4. To analyse selected episodes of past data (support requested from GLWQP).

Performance Indicators/Indicateurs de rendement

- 1.1 Data report and engineering evaluation of GVAPS and MCATS system by October 1984.
- 1.2 Scientific analysis and report on GVAPS and MCATS data by March 1985. This report will relate vertical structure of the horizontal currents and bottom stress to the larger-scale circulations observed with conventional instruments.
- 2.1 Field experiment on water surface slope complete by December 1984.
- 2.2 Data report and preliminary analysis of experiment by April 1985. This study may yield information on the causes of coastal currents and their reversals.
- 3.1 Processing of data from thermistor chains and current meters complete by December 1984. Data report by April 1985.
- 4.1 Scientific reports on selected data sets by April 1985 subject to funds available from GLWQP.

Relevance/Objet

Coastal zones are the areas of most immediate concern to managers and users. There is a continuing need for research on physical processes related to transport of materials through coastal zones and to biochemical processes. This information is vital to the solution of practical problems such as the environmental impact of energy development. Goal 3 refers to a pilot study which may lead to a more ambitious interdisciplinary effort to study the biochemical implications of nearshore physical processes. Relevant to IJC/GLWQA items 104, 109, IJC/SAB items 218, 201, IJC/WQB items 326, 320 and programs of Ontario MOE and MNR.

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Study Plan  
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NO: 84-  
513

STUDY TITLE TITRE D'ETUDE	Presentation and Interpretation of Great Lakes Physical Data - User Services		DIVISION APSD
KEY WORDS MOTS CLEFS	GREAT LAKES, CURRENTS, TEMPERATURE, DATA BASES, LAKE ONTARIO, WIND, CLIMATE		SECTION PHYSLIM
STUDY LEADER/ CHEF D'ETUDE	Boyce, F.M.	TEL: 637-4277	PAE 1512 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	Staff of Physlim Section.		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	Head, WQB - OR		TEL: 637-4663
			INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To provide an NWRI wide service in the reduction, formatting and editing of the field tapes from the NWRI common user current meter stock, and for the NWRI tide gauges, FTP and CATS systems. Data are processed on request and subject to established priorities.
2. To provide information (data and interpretation) on the distribution of currents and temperatures in the Great Lakes. Agencies served are typically other federal and provincial agencies, universities, consulting engineering firms, lake Ontario Charter Boat Operators, shipping interests, etc. As an example, work will continue on the Great Lakes Climatic Atlas, a joint endeavour with Atmospheric Environment Service (CCC).
3. To provide technical consultation on physical data measurements and the analysis of the resulting data bases. An example here is the assistance in the implementation of storm surge forecasting models (HRD study, MOT commission).

Performance Indicators/Indicateurs de rendement

1. Data bases under item 1 above available for analysis on an agreed priority basis.
2. Draft report on the general distribution of temperatures and currents in Lake Ontario prepared as input to the joint AED-NWRI endeavour under item 2 above.
3. Storm Surge Model available and reported in joint HRD-APSD publication.
4. Other reports as required.

Relevance/Objet

There are many requests for information on winds, temperature structure and currents from users among the groups named above. Some of these are routinely serviced, others are met by special processing or could be met by a Climatic Atlas. The NWRI data base on physical properties of the Great Lakes is the most complete available in the Great Lakes basin and is therefore in demand by users that include Federal and Provincial agencies, Ontario Hydro, Consulting Engineering Firms, and special activities.

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NO: 84-  
514

STUDY TITLE TITRE D'ETUDE	Niagara River Plume		DIVISION APSD
KEY WORDS MOTS CLEFS	NIAGARA RIVER, LAKE ONTARIO, LAGRANGIAN, CONTAMINANTS, TRANSPORT		SECTION ENVSIM
STUDY LEADER/ CHEF D'ETUDE	Murthy, C.R.	TEL: 637-4235	PAE EAP 1512
TEAM MEMBERS/ MEMBRES D'EQUIPE	J.A. Bull, K.C. Miners, L. Royer, D.C.L. Lam		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1982	FINISH FIN 1985	NWRI GLWQA
OPERATIONAL CONTACT OPERATIONNEL	P.P. Yee, WP&M - OR		TEL: 637-4711

Goals/Buts

1. To analyse and synthesize Lagrangian drifter and EBT data bases from FY 1983/84 experiments in a format compatible for the interpretation of the movements of contaminants in Niagara River (NR) plume.
2. To plan and conduct three field experiments in support of ECD-220 study plan. To measure the contaminantion of L. Ontario by persistent organics and toxic substances from Niagara River plume.
3. To interface the seasonal circulation and transport models of Niagara River plume and L. Ontario with the biochemical and contaminant distributions.

Performance Indicators/Indicateurs de rendement

1. Data report of the FY 1983/84 NR plume experiments to be prepared by September 1984.
2. Conduct three field experiments designed to look at the large scale influence of NR plume on L. Ontario using conventional and remotely tracked drifters.
3. Report summarizing the physical, biochemical, and toxic contaminants transport models to be completed by March 1985.

Relevance/Objet

The Niagara River has been identified as a critical and potentially serious source of toxic contaminants to Lake Ontario. An understanding of the processes by which these contaminants would be reactive in the lake is vital to a management program. The results of this research are of interest to the Niagara Task Force (Ontario, RDG), the GLWQP and other public bodies having concern for the Lake Ontario Contamination from the Niagara River.

STUDY TITLE TITRE D'ETUDE	Water Quality Simulation for Ice-Covered Lakes and Reservoirs	DIVISION APSD	
KEY WORDS MOTS CLEFS	LIMNOLOGY, ICE, WATER QUALITY, MODELS, NORTH, RESERVOIRS, YUKON, FRAZIL ICE, CURRENTS, DIVERSIONS	SECTION PHYSLIM	
STUDY LEADER/ CHEF D'ETUDE	Hamblin, P.F.	TEL: 637-4277	
TEAM MEMBERS/ MEMBRES D'EQUIPE		PAE EAP 1512	
TIME FRAME CALENDRIER	START DEBUT 1982		FINISH FIN 1985
OPERATIONAL CONTACT OPERATIONNEL	A. Ellis, WP&M - HQ	TEL: 997-1461	FUNDING SOURCE FINANCEMENT NWRI <u>INTEREST/INTERET DIRECT-GENERAL</u>

#### Goals/Buts

1. To implement a presently available dynamic simulation model of temperature and dissolved and suspended solids in a Yukon Basin lake demonstrating behaviour in common with northern reservoirs. To update the model in areas where knowledge is incomplete for example, frazil ice effects and lake to ice heat transfer based on field measurements.
2. In cooperation with Engineering, test instrumentation for under-ice measurement of low velocity flow.
3. In cooperation with NWRI, P&Y Detachment, conduct field measurements of under-ice flow in northern lakes in the winter of 1985.

#### Performance Indicators/Indicateurs de rendement

1. Verification analysis of model performance based on field data subject to progress in field data reduction, NWRI Pacific and Yukon Region. Report evaluation expected in January 1985.
2. Select the most promising velocity measurement technique and carry out feasibility tests by January 1985.
3. Field measurement of currents in ice-covered lake in winter 1985 to be completed as ice conditions permit - possibly to continue in April 1985.

#### Relevance/Objet

Establishing the ecological sensitivity of northern lakes and reservoirs to resource development is identified as a national priority. See for example ECS Strategic Plan (1982/87) "begin research into the impacts of major water diversions and the impacts of hydroelectric development in northern areas". This study relates to the NWRI Pacific and Yukon Region program to investigate and model the factors that control water quality in northern lakes and reservoirs.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 540	
STUDY TITLE TITRE D'ETUDE	Application of Optical Measurements to Lake Research		DIVISION APSD	
KEY WORDS MOTS CLEFS	GREAT LAKES, NIAGARA RIVER, OPTICS-LAKE, PLUMES, SATELLITES, WATER QUALITY		SECTION ENVOPTIC	
STUDY LEADER/ CHEF D'ETUDE	Bukata, R.P.	TEL: 637-4670	PAE EAP 1512	
TEAM MEMBERS/ MEMBRES D'EQUIPE	J.H. Jerome and J.E. Bruton R. Desrosiers, HD		FUNDING SOURCE FINANCEMENT NWRI	
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN		Ongoing
OPERATIONAL CONTACT OPERATIONNEL	Head, WQB - P&YR		TEL: 544-6019	INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. To analyze the presently available reflectance radiometer data for the Great Lakes in 1983 in terms of water quality using available models and carry out reflectance measurements during the Lake Huron and Lake Ontario surveillance program.
2. Using the existing transmissometer data base, reduce the data and analyze the characteristics and dynamics of the nepheloid layer in Lake Ontario.
3. Define and describe the dynamic behaviour of the Niagara River plume and of selected coastal zones using satellite imagery in cooperation with Studies 514 and 512.
4. Participate in a theoretical study (in collaboration with HD study 352) which incorporates Mie scattering theory into the Monte Carlo simulations of radiative transfer.

#### Performance Indicators/Indicateurs de rendement

1. Report on the application of Surface Reflectance Radiometer Surveys (SRRS) to remote water quality measurements by March 1985.
2. Reflectance Radiometer measurements to be completed for Lakes Ontario and Huron and data reported by December 1984.
3. A summary report of the characteristics and dynamics of the nepheloid layer in Lake Ontario to be completed by March 1985.
4. A report on the classification of seasonal behaviour of Niagara River plume in terms of satellite observable climatic effects.
5. An operational computer simulation of radioactive transfer by March 1985.

#### Relevance/Objet

The transparency and colour of waters have been traditional indicators of water quality. The massive availability of satellite imagery offers the possibility of rapid wide scale assessment of waters in Canada. These requirements are recognized in GLWQA Annex 11, Surveillance and Monitoring. Study results are relevant to Niagara River Toxics Committee, IJC GLWQA, DOE and IWD Ontario Region, NHRI and The Canada Centre for Remote Sensing (CCRS).

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STUDY TITLE TITRE D'ETUDE	CCIW Data Archiving		DIVISION APSD	
KEY WORDS MOTS CLEFS	GREAT LAKES SURVEILLANCE, DATA MANAGEMENT, DATA HISTORICAL		SECTION DATAM	
STUDY LEADER/ CHEF D'ETUDE	Nagel, W.	TEL: 637-4536	PAE EAP 1113	
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Byron, J. McAvenna, and R. Duffield		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	M. Neilson, WQB - OR		TEL: 637-4641	INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. Provide scientific data gathering, reduction, transcription and editing services for the Great Lakes Surveillance program, (Meteorological Buoy Data Editing) a solar radiation network and a toxic contaminants measurement program.
2. Provide archiving facilities and services for all scientific data gathered at NWRI and assist in data collection and reduction requirement reviews.
3. Provide for data security.
4. Provide data documentation and reference systems and retrieval assistance or services.

Performance Indicators/Indicateurs de rendement

1. Coordination and liaison will be maintained between sample acquisition and analytical service agencies to ensure complete, timely and accurate data input to systems. Analog data will be reduced and transcribed to digital scientific units. Data will be converted to processible media, followed by quality control and editing using batch and on-line computer methods.
2. Edited data will be added to matching processible media and source records will be archived and catalogued to standard procedures while maintaining access to data bases at all times.
3. Data will be protected against loss or modifications by microfilming or microfiching and back up tape file storage in fireproof vaults.
4. Data are documented as to discrepancies, anomalies and history. Users are guided in defining and obtaining data sets relevant to their projects. Data are retrieved using relevant selection criteria, and supplied on various media to authorized agencies or personnel. Generalized programs are run to produce a variety of standard and custom designed data statistics and displays.

Relevance/Objet

Water quality data are required for problem analysis, interpretation of environmental dynamics, reporting ambient conditions, establishing trends, making projections and international exchange on a reliable and timely basis. Maintenance of a complete and reliable archive is vital to historical analysis of environmental concerns.

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NO: 84-  
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STUDY TITLE TITRE D'ETUDE	Water Quality Data Base Administration			DIVISION APSD
KEY WORDS MOTS CLEFS	DATA MANAGEMENT, EDP CONSULTATION, SYSTEMS ANALYSIS			SECTION DATAM
STUDY LEADER/ CHEF D'ETUDE	Duffield, R.		TEL: 637-4324	PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	A. Zingaro and W. Nagel			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	March 1985 NWRI
OPERATIONAL CONTACT OPERATIONNEL	R. Stevens, WQB - OR		TEL: 637-4641	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. Support and maintain corporate data bases, and facilitate data analysis and interpretation of water quality data.
2. Provide for operational accessibility to current and historical data acquired by the Centre.
3. Provide for the security of data bases.
4. Install and maintain the current version of Systems 2000.
5. Acquire and manage new data bases in support of federally mandated programs.
6. Provide for the orderly development of management strategies for environmental data.

Performance Indicators/Indicateurs de rendement

1. The data base systems should remain accessible to the scientific research community and provide standard programs to facilitate data analysis.
2. a) Prepare appropriate operational documentation or policy proposals for the data bases.  
b) Prepare documentation related to the STAR data base including microfiching for publication.
3. Damaged data bases will be restored within 48 hours by regeneration from current operational backups of the data.
4. Install, test and implement new versions of the S2K within one month of receiving them.
5. New data bases will be developed in a timely and efficient manner to meet requirements for new approved program initiatives.
6. Participate in meetings or assume delegated responsibility on internal or departmental committees and work groups engaged in the development of plans and policy recommendations in relation to the management of environmental data.

Relevance/Objet

This work is necessary to fulfil the desired aims of established programs and new initiatives, to maintain corporate data bases and to identify and enunciate the implications of various alternative strategies available to CCIW management groups. It also provides facilities for timely access to data and convenient analytical and interpretive tools for scientists.

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STUDY TITLE TITRE D'ETUDE	EDP Support - Data Management		DIVISION APSD		
KEY WORDS MOTS CLEFS	EDP SUPPORT, DATA MANAGEMENT		SECTION DATAM		
STUDY LEADER/ CHEF D'ETUDE	Comba, H.	TEL: 637-4628	PAE EAP 1516		
TEAM MEMBERS/ MEMBRES D'EQUIPE	Head of Data Management and staff		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	MARCH 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL	

Goals/Buts

1. To provide computer based systems development support to approved CCIW activities by scheduling and monitoring the work.
2. To provide professional EDP consultation.
3. To provide adequate training to DM staff as resources permit and to provide training to the computer users to give them a basin knowledge and to ensure efficient utilization of the central computing facilities.

Performance Indicators/Indicateurs de rendement

1. Work schedule will be distributed and time spent will be monitored, recorded and posted monthly. The schedules will be altered to ensure work load leveling and to meet the changing needs of CCIW. Analysis of the requirements, priority, and time scheduled and a review of existing software will be made before work is begun. The final product will be returned to the end user. Software will be written using self documenting techniques.
2. EDP consulting services will be maintained to solve short term problems and to encourage efficient use of limited resources with emphasis on large consultation requests where the work is being done by the end user.
3. Continue training programs as funds permit to keep DM staff technologically abreast. Continue to provide introductory and advanced courses for computer users as needed and give more personalized courses when warranted.

Relevance/Objet

The need has previously been identified for centralized programming support to ensure efficient utilization of the CCIW computer. Expertise in various areas of endeavour are developed. Duplication of effort is avoided by standardizing procedures. Programming support is provided to people who do not have the skills or the time or a requirement for a full time person to do the work. Effort is expended in direct support of all agencies at CCIW.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 574
STUDY TITLE TITRE D'ETUDE	Graphics and Microcomputer Networking		DIVISION APSD
KEY WORDS MOTS CLEFS	COMPUTER, DATA MANAGEMENT, QUALITY CONTROL, CURRENT METER		SECTION DATAM
STUDY LEADER/ CHEF D'ETUDE	Beal, S.	TEL: 637-4373	PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	B. Hanson		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	W.L. Kreuder, WRB - P&YR		TEL: 666-3715 INTEREST/INTERET <u>DIRECT-GENERAL</u>

#### Goals/Buts

1. To implement data editing procedures on a PDP-11/60 computer.
2. To incorporate improvements identified during the operation of earlier systems on a PDP-15.
3. Develop software to permit micro/minicomputer systems of various types to exchange data reliably.

#### Performance Indicators/Indicateurs de rendement

1. Bring data editing facilities on PDP-11/60 and NORPAK Supervision terminal to operational status.
2. Redeveloped software in line with new hardware capabilities and streamlined operations will be completed.
3. Demonstrate reliable data communications among NWRI CYBER, PDP-11/60, WQB-VAX, IBM-PC(CP/M) machines and others by dial up and hard-wired lines.

#### Relevance/Objet

1. Required for quality assurance of MET, FTP and current meter data.
2. A unified system for data interchange is needed to optimize use of micros in the labs, the offices and field.

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NO: 84-  
575

STUDY TITLE TITRE D'ETUDE	GEMS/UNEP - Global Water Quality Data Management		DIVISION APSD
KEY WORDS MOTS CLEFS	GLOBAL, WATER QUALITY, DATA MANAGEMENT, INTERNATIONAL RELATIONS, GEMS/WATER		SECTION DATAM
STUDY LEADER/ CHEF D'ETUDE	Duffield, R.	TEL: 637-4292	PAE EAP 1170
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Byron		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	S. Whitlow, WQB - HQ	TEL: 997-3422	INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. To maintain, operate and enhance, an expanding globally centralized computer based storage and retrieval system for surface and groundwater quality data.
2. Provide for file security and controlled access.
3. Provide standard and selective data retrieval and information processing services on demand.
4. Provide training and consultation services.

Performance Indicators/Indicateurs de rendement

1. Systematic procedures will be maintained to handle irregular submissions of global water quality monitoring data from six international regions covering the earth, converting data to locally processible media from forms, listings, cards or magnetic tapes as received.
2. Data files will be updated and relevant data base management files covering station history, parameter dictionary and global water quality data will be generated and regularly and securely archived.
3. Supplementary software will be developed as required for the retrieval, summarization and display of the data and to respond to scientific and operational enquiries from 152 countries.
4. Training materials and services will be provided as required at Regional Centres in other countries. Consultation services will be provided on request.

Relevance/Objet

NWRI has accepted responsibility to develop, implement and operate data base management facilities for the human health related Global Water Quality monitoring project sponsored by UNEP/WHO/UNESCO/WMO, and provide relevant expertise on request.

# ANALYTICAL METHODS DIVISION



### Analytical Methods Division

The mandate of the Analytical Methods Division is to advance knowledge, establish and maintain expertise and provide information on analytical chemistry and microbiology. Providing information includes analytical methodology support to IWD operational laboratories, NWRI scientists, the Great Lakes Water Quality Program, the Toxic Chemicals Management Program, the Long Range Transport of Airborne Pollutants Program and other clients, and implementing interlaboratory quality assurance programs for regional, national, LRTAP, and GLWQP laboratories. In this respect we can be considered a combined research division and national laboratory.

The Division is responsible for long and short term research to advance knowledge of chemical and microbiological methodologies, including sample collection and preservation techniques, in water, suspended material, sediment, effluents and biota. Technology transfer of completed methods to the IWD operational laboratories or other clients such as federal, provincial, university and industrial laboratories as well as international standards agencies is considered an integral part of any development study. In the case of the WQB, the method is presented to the National and Regional Laboratories and the Laboratory Operations Division, HQ in a format suitable for inclusion in the WQB Analytical Methods Manual. Specification statements for this manual are also prepared by AMD staff. The Microbiological Laboratories Section publishes and maintains its own manual, "Methods for Microbiological Analysis of Waters, Wastewaters and Sediments Manual". This document is used by water quality laboratories in many countries (current distribution list - over 600).

The Division also offers limited analytical support to other scientists within CCIW requiring specialized equipment or facilities which are only available within the Analytical Methods Division. Such support includes high resolution gas chromatography-mass spectrometry, high pressure liquid chromatography, flow injection analysis, use of the Clean and Hazardous Chemicals Laboratory and various microbiological services.



## STUDIES FOR ANALYTICAL METHODS DIVISION

SECTION	STUDY	STUDY TITLE	STUDY LEADER	84/05/01.
DIVISION	600	ANALYTICAL METHODS DIVISION	LAWRENCE, J.	
ANALYTICAL CHEMISTRY RESEARCH				
	601	EXPLORATION OF SUPERCRITICAL FLUID SEPARATION SYSTEMS	ONUSKA, F. I.	
	602	DETERMINATION OF ELEMENTS AND ORGANOMETALS BY ATOMIC SPECTROSCOPY	GOULDEN, P. G.	
	603	ELECTROANALYTICAL TECHNIQUES IN WATER ANALYSIS	SEKERKA, I.	
	604	HIGH PRESSURE LIQUID CHROMATOGRAPHY FOR TRACE ORGANICS	SCOTT, B. F.	
	605	GENERAL MAINTENANCE AND TECHNOLOGY TRANSFER	SEKERKA, I.	
	606	ACRS CAPITAL ACQUISITION	SEKERKA, I.	
	610	VALIDATION OF TOXAPHENE METHODOLOGY	ONUSKA, F. I.	
	611	CLEANUP AND SEPARATION PROCEDURE FOR TRACE ORGANICS ANALYSIS	SEKERKA, I.	
	612	RADIOIMMUNIASSAY (RIA) TECHNIQUES FOR DIOXINS	SEKERKA, I.	
MICROBIOLOGY LABORATORIES				
	621	MEDIA, WASH-UP, INSTRUMENT AND GENERAL SUPPORT	MCINNIS, R.	
	622	LEGIONELLA, COLIPHAGE AND NOVEL BACTERIA	DUTKA, B. J.	
	623	TOXICITY SCREENING, METHODS EVALUATION AND TESTING	JOVA, A.	
	624	BACTERIAL TOXICITY SCREENING SYMPOSIUM	DUTKA, B. J.	
	625	MICROBIOLOGY SUPPORT TO IWD WATER QUALITY NETWORK	KWAN, K. K.	
	626	MICROBIAL RESPONSE TO LOADINGS IN LAKE ST. LOUIS AND LAKE ERIE	RAO, S. S.	
	627	ACIDIFICATION AND HEAVY METAL INTERACTIONS IN MICROORGANISMS	RAO, S. S.	
QUALITY ASSURANCE METHODS				
	641	QUALITY ASSURANCE AND METHODS SECTION - ADMINISTRATION AND MANAGEMENT	CHAU, A. S. Y.	
	642	ORGANIC METHODS DEVELOPMENT	STOKKER, Y. D.	
	643	WQB AND PPWB QUALITY ASSURANCE PROGRAM	ALKEMA, H.	
	644	CERTIFIED REFERENCE MATERIALS, METHODS & PRESERVATION FOR INORGANICS	CHEAM, U.	
	645	CAPITAL EQUIPMENT ACQUISITION (QAMS)	CHAU, A. S. Y.	
	650	IJC QUALITY CONTROL	ASPILA, K. I.	
	651	LRTAP INTERLABORATORY QUALITY CONTROL STUDIES	ASPILA, K. I.	
	652	QUALITY ASSURANCE PROGRAM - DREDGING	LEE, H. B.	
	653	ORGANIC QUALITY ASSURANCE PROGRAM AND SRM'S	LEE, H. B.	
COMPUTER SERVICES				
	670	COMPUTER SERVICES FOR WATER MANAGEMENT RESEARCH	PULLEY, H. C.	





## PROCESSING FORMS FOR DIVISION AND

DATE RUN 84/05/02.

NO	ORGANIZATION			ENG/MANTEC			TECH OPERATIONS			DATA M-ABASE			EXTERNAL			SHADOW			TOTAL			
	PY SAL	OM	CAP	PY SAL	OM	CAP	PY SAL	OM	OVTM	PY SAL	TOTAL	AGCY PY SAL	OM	CAP COST	PY	SAL	OM	CAP	COST			
644	1.10	38	22.0	18.0	--	--	--	--	--	--	78.0WQB	1.00	35	--	--	0.0	--	2.45	76	22.0	18.0	116.0
644	--	--	--	--	--	--	--	--	--	SHADOW NWQL	ANALYS	--	--	--	--	--	--	--	--	--	--	--
644	--	--	--	--	--	--	--	--	--	FIP	.35	3	--	--	--	--	--	--	--	--	--	--
645	--	--	--	45.0	--	--	--	--	--	--	45.0	--	--	--	--	--	--	--	--	--	--	45.0
645	--	--	--	--	--	--	--	--	--	SHADOW SHIPS	35.5GLWQA	--	--	29.5	2.0	7.5	1.00	35	31.0	2.0	75.0	
650	.90	31	--	--	--	--	--	--	--	.10	3	1.5	.5	--	--	--	--	--	--	--	--	--
650	--	--	--	--	--	--	--	--	--	SHADOW NWQL	ANALYS	--	--	.30	10	57.9LRTP31.00	34	20.0	--	--	--	--
651	.15	36	5.0	7.0	--	--	--	--	--	FIP	.30	3	--	--	--	--	--	--	--	--	--	--
651	--	--	--	--	--	--	--	--	--	7.0GLWQA	.90	27	26.0	--	--	--	--	--	--	--	--	--
652	.20	7	--	--	--	--	--	--	--	SHADOW NWQL	ANALYS	--	--	59.0TCMP	--	--	12.0	40.0	--	--	--	--
652	--	--	--	--	--	--	--	--	--	FIP	.35	3	--	--	--	--	--	--	--	--	--	--
653	.90	31	10.0	10.0	--	--	--	--	--	SHADOW NWQL	ANALYS	--	--	0.0	--	--	1.25	34	22.0	58.0	114.0	
653	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
30.00	1152	696.0	300.0	.50	--	--	--	--	--	.63	7.2	.70	2220.3	160	63.0	--	38.16	867.2	867.2	2682.5		
										19	5.9	23	184.0	6.33	184.0	49.0	49.0	1383	1383	363.0		

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NO: 84-  
600

STUDY TITLE TITRE D'ETUDE	Analytical Methods Division			DIVISION AMD
KEY WORDS MOTS CLEFS	ADMINISTRATION, METHODS DEVELOPMENT, QUALITY CONTROL, MANAGEMENT			SECTION AMDDIV
STUDY LEADER/ CHEF D'ETUDE	Lawrence, J.		TEL: 637-4319	PAE EAP 1515
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Burford			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A			TEL:  INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

To ensure effective administration of the Analytical Methods Division and to provide leadership to the scientific program.

Performance Indicators/Indicateurs de rendement

Plan, implement and administer the activities of the Analytical Methods Division - ongoing.

Relevance/Objet

The Analytical Methods Division responds to the needs of scientists in other NWRI research division, WQB, EPS, GLFRB and ECS.

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NO: 84-  
601

STUDY TITLE TITRE D'ETUDE	Exploration of Supercritical Fluid Separation Systems	DIVISION AMD
KEY WORDS MOTS CLEFS	INSTRUMENTATION, EQUIPMENT, ANALYSIS, TECHNOLOGY TRANSFER, TOXIC SUBSTANCES	SECTION ACRS
STUDY LEADER/ CHEF D'ETUDE	Onuska, F.I.	TEL: 637-4635 PAE 4100 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Terry	FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT Apr. 1984 FINISH FIN March 1986	
OPERATIONAL CONTACT OPERATIONNEL	B.K. Afghan, NWQL	TEL: 637-4661 INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. To build a narrow bore supercritical fluid chromatography system.
2. To evaluate the feasibility of the system using carbon dioxide as a supercritical fluid.

Performance Indicators/Indicateurs de rendement

1. Compilation of work in supercritical fluid extraction and supercritical fluid chromatography. April - May 1984.
2. Stationary phases suitability by May 1984.
3. Status report on feasibility of supercritical fluid chromatography in environmental analysis by March 1985.
4. Preparation of narrow and very narrow core columns (30 - 150 m) with chemically bonded and crosslinked structures (May 1984 - March 1986).
5. Design of the chromatographic system (May 1984 - June 1985).
6. Evaluation pressure programming (April 1985 - March 1986).
7. Evaluation of density programming (January 1986 - March 1986).
8. Compiler and software (August 1984 - December 1985).

Relevance/Objet

This basic research combined with applied research data in supercritical chromatography will extend capabilities of the separation process of many high molecular compounds (MW > 550, e.g. chlorinated terphenyls, tar acids and humic acids) which cannot be separated by GC and HPLC in water, sediment and fish samples.

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NO: 84-  
602

STUDY TITLE TITRE D'ETUDE	Determination of Elements and Organometals by Atomic Spectroscopy	DIVISION AMD	
KEY WORDS MOTS CLEFS	TOXIC SUBSTANCES, ORGANICS, METALS, ORGANOTINS, ORGANOLEADS, ALUMINUM	SECTION ACRS	
STUDY LEADER/ CHEF D'ETUDE	Goulden, P.G.	TEL: 637-4658	PAE EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	D.H.J. Anthony		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1981	FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	V. Komadina, WQB - AR	TEL: 388-6606	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. Develop methodology for separation and identification of organics and organometals using ICAP and microwave plasma as detectors.
2. Develop method for analysis of metals by ICAP with a new ultrasonic nebulizer.
3. Develop method for determination of monomeric inorganic aluminum in water.

Performance Indicators/Indicateurs de rendement

1. (a) operating separation process for Pb and Sn alkyls (Oct. 1984).  
(b) internal report and/or publication by March 1985.
2. (a) performance characteristics of high frequency transducers established by October 1984.  
(b) internal report and/or publication by March 1985.
3. (a) preliminary options for Al method determined by October 1984.  
(b) internal report and/or publication by March 1985.

Relevance/Objet

These projects are being undertaken in response to requests from WQB/IWD, GLFRB/DFO, and other clients. Details are available upon request.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
603

STUDY TITLE TITRE D'ETUDE	Electroanalytical Techniques in Water Analysis		DIVISION AMD
KEY WORDS MOTS CLEFS	ANALYTICAL METHODS, INSTRUMENTATION, WATER QUALITY, METALS, TRACE ELEMENTS, PROFILING		SECTION ACRS
STUDY LEADER/ CHEF D'ETUDE	Sekerka, I.	TEL: 637-4657	PAE 4100 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	J.F. Lechner		FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT 1982	FINISH FIN March 1985	
OPERATIONAL CONTACT OPERATIONNEL	F.T. Mah, WQB - P&YR	TEL: 987-7756	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. To document current status of dissolved oxygen profiler.
2. To develop methods of water analysis employing "Flow Injection Analysis" (FIA) technique.

Performance Indicators/Indicateurs de rendement

1. Complete documentation of current status of fact response dissolved O<sub>2</sub> profiler.
2. (a) Critical review of existing FIA methods in respect to their application for water analysis by July 1984.  
 (b) FIA methods for Alkalinity and Acidity - report and transfer to WQL by August 1984.  
 (c) FIA method for dissolved oxygen - report by November 1984.  
 (d) Design of multiparameter FIA system by March 1985 as possible replacement for colorometre procedures currently used by NWQL.

Relevance/Objet

FIA is a new technique suitable for a large number of samples analysis. It has a great potential of improving routine analysis of water samples from economical as well as from technological aspects. This technique could conceivably replace the present colorometre techniques presently used for many inorganic parameters by the NWQL.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
604

STUDY TITLE TITRE D'ETUDE	High Pressure Liquid Chromatography for Trace Organics	DIVISION AMD
KEY WORDS MOTS CLEFS	ORGANICS, ANALYSIS, PAH'S, ANALYTICAL METHODS, NITROGEN, OXYGEN, PHTHALATE ESTERS	SECTION ACRS
STUDY LEADER/ CHEF D'ETUDE	Scott, B.F.	TEL: 637-4596 PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Ryan	FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT 1982	FINISH FIN 1986
OPERATIONAL CONTACT OPERATIONNEL	B.K. Afghan, NWQL	TEL: 637-4661 INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To explore analytical application of HPLC- microbore columns combined with new spectroscopic or electroanalytical techniques for the analysis of nitrogen, oxygen, or halogen containing compounds.
2. To validate and extend microbore column and electron capture detector capabilities for Phthalate Ester Methodology.

Performance Indicators/Indicateurs de rendement

1. Interim reports in August 1984 and March 1985.
2. Final report and validation due in August 1985 (extension of reporting date was necessitated by moving of laboratories and reassignment of study leader), with report on extension of methodology to be prepared for February.

Relevance/Objet

The thrust of the study meets with the needs of IWD operational units in the area of improved methodology for a number of compounds in environmental samples.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
605

STUDY TITLE TITRE D'ETUDE	General Maintenance and Technology Transfer			DIVISION AMD
KEY WORDS MOTS CLEFS	ANALYTICAL METHODS, TECHNOLOGY TRANSFER, ADMINISTRATION, STANDARDS			SECTION ACRS
STUDY LEADER/ CHEF D'ETUDE	Sekerka, I.	TEL: 637-4657	PAE EAP	4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	P.D. Goulden, F. Onuska, B. Scott, J. Ryan W. Wilkinson, J. Lechner, K. Terry		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT Ongoing	FINISH FIN	March 1985	NWRI TCMP
OPERATIONAL CONTACT OPERATIONNEL	M. Forbes, WQB - HQ	TEL: 997-1921	INTEREST/INTERET <u>DIRECT-GENERAL</u>	

Goals/Buts

1. Provide consultation and assistance in Analytical Chemistry Research Section (ACRS) areas of expertise and response to short term requests.
2. Transfer developed methods to clients for routine application.
3. Provide specialized services.
4. Maintain High Hazard Laboratory as a multi-use facility and establish standards reporting.

Performance Indicators/Indicateurs de rendement

Active participation at scientific meetings - review of scientific papers - consultation - publication - preparation of methods manuals, etc.

Developed methods suitable for routine application will be transferred to NWQL on an as needed basis.

Standards of hazardous compounds will be validated and provided to clients as needed.

Relevance/Objet

This type of activity is required to satisfy IWD requirements as well as to promote and apply the work of ACRS.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 606		
STUDY TITLE TITRE D'ETUDE	ACRS Capital Acquisition		DIVISION AMD		
KEY WORDS MOTS CLEFS	CAPITAL, EQUIPMENT		SECTION ACRS		
STUDY LEADER/ CHEF D'ETUDE	Sekerka, I.	TEL: 637-4657	PAE EAP 4100		
TEAM MEMBERS/ MEMBRES D'EQUIPE	P.D. Goulden, F.I. Onuska, B. Scott		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	March 1984	FINISH FIN	March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL	

#### Goals/Buts

1. Based on market availability and specifications required, review, select and purchase capital items in accordance with the AMD capital equipment acquisition plan.

#### Performance Indicators/Indicateurs de rendement

1. The following equipment and instruments will be reviewed and ordered by August 1984.
  - a) High speed, dual channel integrator (for project 601)
  - b) GC oven (for project 602)
  - c) Integrator (for project 602)
  - d) Oscilloscope (for project 603)
  - e) Photometer (for project 603)
  - f) Multichannel Pump (for project 603)
  - g) Sample delivery system (for project 611)
  - h) Solvent delivery system (for project 611)

#### Relevance/Objet

New Instrumentation is required to carry out research and development as outlined in ACRS studies for DY 84/85.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 610
STUDY TITLE TITRE D'ETUDE	Validation of Narrow Bore High Resolution Gas Chromatography for Toxaphene and Dioxins		DIVISION AMD
KEY WORDS MOTS CLEFS	ANALYTICAL METHODS, TOXAPHENE, DIOXIN, METHODS, DEVELOPMENT		SECTION ACRS
STUDY LEADER/ CHEF D'ETUDE	Onuska, F.I. and B.F. Scott	TEL: 637-4635	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Terry, J. Ryan and W. Wilkinson		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1982	FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	B.K. Afghan, NWQL	TEL: 637-4661	INTEREST/INTERET <u>DIRECT-GENERAL</u>

#### Goals/Buts

1. To validate HRGC-ECD and separation procedure for dioxins as previously developed by AMD.
2. To validate toxaphene methodology as used by GLWQ laboratories.

#### Performance Indicators/Indicateurs de rendement

1. Sampling done by May 1984.
2. Sample processing and cleanup by August 1984.
3. Analysis completed by February 1985.
4. Statistical evaluation by March 1985.
5. Dioxin report by March 1985.
6. Toxaphene report by March 1985.

#### Relevance/Objet

Complete procedures for determining Toxaphene and Dioxins will be reported in the form suitable of practical application. Final steps of the validation will be conducted in close cooperation with NWQL.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
611

STUDY TITLE TITRE D'ETUDE	Cleanup and Separation Procedures for Trace Organics Analysis	DIVISION AMD
KEY WORDS MOTS CLEFS	METHODS DEVELOPMENT, INSTRUMENTATION, ORGANICS, DIOXINS, TOXIC SUBSTANCES, BENZOFURANS	SECTION ACRS
STUDY LEADER/ CHEF D'ETUDE	Sekerka, I.	TEL: 637-4657
TEAM MEMBERS/ MEMBRES D'EQUIPE	W. Wilkinson	PAE 4100 EAP
TIME FRAME CALENDRIER	START 1982 DEBUT	FINISH FIN March 1985
OPERATIONAL CONTACT OPERATIONNEL	B.K. Afghan, NWQL	TEL: 637-4661
		FUNDING SOURCE FINANCEMENT NWRI GLWQA
		INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To develop cleanup and separation procedures for tetra; penta; hexa; hepta and octachlorodibenzofurans including large sample handling.
2. To develop multidetection system for LC.
3. To extend developed procedure to other parameters of interest - multiresidue cleanup.

Performance Indicators/Indicateurs de rendement

1. Evaluation of developed procedure by November 1984.
2. Interfacing microbore LC to GC detectors by April 1985.
3. Design of multiresidual cleanup scheme by April 1985.

Relevance/Objet

Project is being undertaken in response to WQB/IWD, and GLFRB/DFO requirements.

Continuation of study 83-619

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
612

STUDY TITLE TITRE D'ETUDE	Radioimmuniassay (RIA) Techniques for Dioxins		DIVISION AMD
KEY WORDS MOTS CLEFS	ANALYTICAL METHODS, DIOXINS, METHODS DEVELOPMENT		SECTION ACRS
STUDY LEADER/ CHEF D'ETUDE	Sherry, J.P.	TEL: 637-4313	PAE EAP 4100
TEAM MEMBERS/ MEMBRES D'EQUIPE	R.J. Wilkinson		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI TCMP
OPERATIONAL CONTACT OPERATIONNEL	A. Demayo, WQB - HQ	TEL: 997-1920	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To evaluate the reproducibility of the labelling procedure for dioxin derivatives.
2. Calibration and standardization of the procedure and analysis of environmental samples in order to test the performance and applicability of the procedure.
3. Transfer interim methodology to NWQL.
4. Evaluate the specificity of the RIA for PCDDs.
5. Modify a previously developed clean-up procedure for use with the RIA technique.

Performance Indicators/Indicateurs de rendement

1. Data interpretation and reporting by August 1984.
- 2-4. Technology transfer, November 1984, critical report by January 1985.
5. Preliminary review and plan of experiments by March 1985.

Relevance/Objet

The evaluation of the RIA technique was initiated to satisfy an IWD requirement for a screening capability for dioxins with special reference to 2,3,7,8-TCDD and other isomers or PCDDs.

Continuation of study 83-616

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
621

STUDY TITLE TITRE D'ETUDE	Media, Wash-up, Instrument and General Support			DIVISION AMD
KEY WORDS MOTS CLEFS	WASTE MANAGEMENT, BACTERIA, PUBLIC WORKS, EQUIPMENT, MICROBIOLOGY, QUALITY CONTROL			SECTION MLS
STUDY LEADER/ CHEF D'ETUDE	McInnis, R.		TEL: 637-4579	PAE 1515 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE				FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT	1970	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	N/A			TEL:
				INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To provide as required, media and wash-up support to the Microbiology Laboratories Section and other NWRI and CCIW units requiring this service.
2. To maintain common user equipment in good repair.
3. To maintain cultures of bacteria as stock.

Performance Indicators/Indicateurs de rendement

1. Customer satisfaction and projects not being delayed by services required.
2. Semi-annual and annual statement to Section Head and clients.

Relevance/Objet

This study provides essential support to all activities of the Microbiology Laboratories Section. Other Divisions of NWRI and several projects within the Department of Fisheries and Oceans are also supported by this study.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
622

STUDY TITLE TITRE D'ETUDE	Legionella, Coliphage and Novel Bacteria		DIVISION AMD
KEY WORDS MOTS CLEFS	B.C., SAS., ONTARIO, MANITOBA, DISTRIBUTION, METHODS DEVELOPMENT, HABITAT, WATER QUALITY, ALGAE, QUEBEC		SECTION MLS
STUDY LEADER/ CHEF D'ETUDE	Dutka, B.J.		TEL: 637-4286 PAE EAP 1515
TEAM MEMBERS/ MEMBRES D'EQUIPE	K. Walsh		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1982	FINISH FIN 1986	NWRI NH&W
OPERATIONAL CONTACT OPERATIONNEL	L.M. Churchland, WQB - P&YR		TEL: 666-6038 INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

1. Complete National Survey on distribution pattern of Legionella in Canadian waters.
2. Complete studies on Legionella relationship to algae and their survival under varying conditions.
3. Evaluate the use of coliphage to assess water samples for enteric pollution, using B.C. (Fraser River) and Ottawa River water samples, for potential use in the water quality monitoring network.

Performance Indicators/Indicateurs de rendement

1. Complete sampling of typical rivers and lakes in British Columbia, Alberta, Saskatchewan, Manitoba and Northern Ontario (60 samples) by June 1984.
2. Complete all in-house Legionella studies by September 1984.
3. Prepare report on Legionella studies by March 1985.
4. Obtain in-house expertise on coliphage technique by June 1984.
5. Data summary report of coliphage data from Fraser River and Ottawa River samples to be turned over to K.K. Kwan by March 1985 (Study 625).

Relevance/Objet

NWRI and NH&W are trying to establish the distribution pattern of Legionella organisms in Canadian waters. The Coliphage procedure is a new technique which may allow the sampling of remote waters for potential health hazards and thus increase the scope and value of data from the IWD Water Quality Monitoring Network. The International Development Research Centre (IDRC) has a vested interest in the coliphage technique as it is trying to introduce this procedure for use by some of the Third World Countries (Singapore, Malaysia, Thailand) as a water quality guide. The use of this procedure will be monitored by AMD Microbiology staff members.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
623

STUDY TITLE TITRE D'ETUDE	Toxicity Screening, Methods Evaluation and Testing		DIVISION AMD
KEY WORDS MOTS CLEFS	BACTERIA, BIOASSAY, TOXICITY, METHODS DEVELOPMENT, MICROBIOLOGY, B.C., QUEBEC		SECTION MLS
STUDY LEADER/ CHEF D'ETUDE	Jova, A.	TEL: 637-4579	PAE EAP 1515
TEAM MEMBERS/ MEMBRES D'EQUIPE	B.J. Dutka		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT 1983	FINISH FIN 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	J. Merriman, WQB - OR	TEL: 637-4643	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. To establish the appropriate microbial target species to be used in conjunction with the dissolved oxygen probe (microbial electrode system) to screen water samples for toxicant presence.
2. Evaluate the technique against other techniques used in Microbiology Laboratories Section using control chemicals and samples collected from IWD water quality network stations on Fraser River and Ottawa River.

Performance Indicators/Indicateurs de rendement

1-4. All pure chemical comparison studies using microbial electrode technique completed by June 1984.

Relevance/Objet

The dissolved oxygen microbial electrode system which is based on a recent discovery by the Japanese that microbes can be layered directly against an oxygen probe via a membrane filter. This microbe and oxygen probe combination can then be placed in water samples and the effect of toxicant activity on microbial oxygen uptake can be measured directly. If this technique is viable it could provide a simple, inexpensive and reliable means of screening for toxic activity. By comparing the various techniques for their sensitivity in screening natural samples, it may be possible to recommend which technique should be used in the battery approach for routine screening of water sample from the water quality monitoring network for toxicants which affect biological activity.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 624
STUDY TITLE TITRE D'ETUDE	Bacterial Toxicity Screening Symposium	DIVISION AMD	
KEY WORDS MOTS CLEFS	BACTERIA, BIOASSAY, ECOTOXICITY, WORKSHOP, INTERNATIONAL RELATIONS	SECTION MLS	
STUDY LEADER/ CHEF D'ETUDE	Dutka, B.J.	TEL: 637-4286	PAE 1515 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	D.L.S. Liu		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START 1982 DEBUT	FINISH 1985 FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Haffner, WQB - HQ	TEL: 997-3422	INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. Hold Second International Symposium on Toxicity Testing Using Bacteria on May 6-10, 1985 in Banff, Alberta.
2. Review submitted abstracts and prepare programme for May 1985 meeting.
3. Update mailing list and ensure mailing of final program.
4. Prepare abstract for printer.

#### Performance Indicators/Indicateurs de rendement

1. Final programme announcing symposium details by November 30, 1984.
2. Printed copy of abstract by January 15, 1985.

#### Relevance/Objet

Bacterial screening tests for toxicity are gaining international recognition as a means of economically and efficiently screening water and effluent samples. Consequently, several European countries have included such procedures into their official government standards. Delegates from 13 countries attended the first symposium, an indication of world wide interest. The Alberta Department of the Environment is sponsoring the Symposium.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
625

STUDY TITLE TITRE D'ETUDE	Microbiology Support to IWD Water Quality Network		DIVISION AMD
KEY WORDS MOTS CLEFS	BACTERIA, BIOASSAY, WATER QUALITY, MICROBIOLOGY, TOXICITY, B.C., QUEBEC, SEDIMENTS		SECTION MLS
STUDY LEADER/ CHEF D'ETUDE	Kwan, K.K.	TEL: 637-4313	PAE EAP 1515
TEAM MEMBERS/ MEMBRES D'EQUIPE	B.J. Dutka		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Haffner, WQB - HQ		TEL: 997-3422
<u>INTEREST/INTERET DIRECT-GENERAL</u>			

Goals/Buts

1. To provide microbial data on biomass, toxicants and health indicator parameters (coliphage) for IWD Monitoring stations on the Ottawa River and Fraser River (B.C.). Approximately 45 samples from the Ottawa River and 60 samples from the Fraser River will be collected.
2. To provide biomass data (ATP) on sediments from Lake St. Louis collected by IWD Quebec Region and Microtox data on sediment-water extracts.
3. To provide information on the stability of samples to toxicity and biomass screening.

Performance Indicators/Indicateurs de rendement

1. Preparation of coordinated data summary report on toxicity, biomass and coliphage results by march 15, 1985.
2. Provision of ATP biomass data and Microtox toxicity data on sediment to IWD Quebec Region by March 1985.
3. Obtain technical competence in ATP sediment measurements using Dr. Afghan's procedure and Turner Luminometer by April 1984.
4. Obtain technical competence in Fluorescent Microscopy and INT-formazan procedure by May 15, 1984.

Relevance/Objet

The Water Quality Monitoring Program of IWD is becoming more involved with biological parameters. This study is designed to assist WQB personnel in this endeavour by selecting suitable parameters and assessing their applicability in Canada wide monitoring studies.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
626

STUDY TITLE TITRE D'ETUDE	Microbial Response to Loadings in Lake St. Louis and Lake Erie		DIVISION AMD
KEY WORDS MOTS CLEFS	BACTERIA, HEAVY METALS, SEDIMENTS, MICROSCOPY, LAKE ERIE, OXYGEN-DISSOLVED, WATER QUALITY, QUEBEC, NUTRIENTS		SECTION MLS
STUDY LEADER/ CHEF D'ETUDE	Rao, S.S.	TEL: 637-4312	PAE EAP 1515
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.A. Jurkovic and M.N. Charlton		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	NWRI
OPERATIONAL CONTACT OPERATIONNEL	H. Sloterdijk, - WQB - QR		TEL: 283-3916 INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To collect information to ascertain the effects of toxic substances on microbiota in L. St. Louis sediments for water quality network studies (IWD Quebec Region).
2. To ascertain bacterial response (population and activity) to reduced nutrient loadings in Lake Erie since 1979.
3. To establish interrelationships between bacteria and dissolved oxygen in Central and East L. Erie basins.
4. As a first step in an understanding of the N<sub>2</sub> cycle in L. Erie, sediment samples from the 2 basins will be examined for bacterial physiological types and concentrations of different forms of nitrogen associated with N<sub>2</sub> cycle and redox potential (personal discussions with Dr. R. Vollenweider). Note: Redox measurements will be made by Dr. I. Sekerka, AMD).

Performance Indicators/Indicateurs de rendement

1. Approximately 50 sediment samples from L. St. Louis submitted by IWD Quebec Region for processing for total, respiring nitrogen and sulfur cycle bacteria. Sampling and processing by September 1984 and Data Summary/Report by March-April 1985.
2. Lake Erie sampling and processing of samples by December 1984.
3. Preliminary report on relationship between O<sub>2</sub> depletion and bacteria by March 1985.
4. Sediment samples analysis by December 1984. Data analysis and preliminary summary by March 1985.

Relevance/Objet

Goal #1 of this study is requested by the IWD Quebec Region and falls within the scope of National Water Quality Network program. Goals #2 and 3. Changes in L. Erie are now occurring as a result of the loading abatement program. This study will document the biological response during the change period. If this work is done, it will bridge the information gaps in our documentation of biological changes and avoid further problems of interpretations in the future. Also this study is applied to the IJC recommendations (1983 Annual Report). This study is within the scope of GLISP. This study is part of the AED study plans (for 84-497) on L. Erie.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
627

STUDY TITLE TITRE D'ETUDE	Acidification and Heavy Metal Interactions in Microorganisms		DIVISION AMD
KEY WORDS MOTS CLEFS	MICROBIOLOGY, MICROSCOPY, ACIDIFICATION, PH, HEAVY METALS, SELENIUM, ONTARIO, LRTAP		SECTION MLS
STUDY LEADER/ CHEF D'ETUDE	Rao, S.S.	TEL: 637-4312	PAE EAP 1515
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.A. Jurkovic, G.G. Leppard, J.O. Nriagu, D. Urciuoli		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1986	NWRI LRTAP
OPERATIONAL CONTACT OPERATIONNEL	F.C. Elder, IWD LRTAP Coordinator	TEL: 637-4212	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To ascertain the effects of low pH on the structure and physiology of lake microbes relevant to acid rain research needs.
2. To study the role of selenium in the amelioration of heavy metal toxicity in lakes.
3. To assess the possible role of microorganisms in the mobilization of heavy metals as well as changes in this role brought about by low pH.

Performance Indicators/Indicateurs de rendement

1. Evaluate changes in microbial populations and heavy metal concentrations in acid stressed Silver Lake and non-acid stressed McFarlane Lake. Field work completion (1st phase) by October 1984. Preliminary report summarizing the results by December 1984.
2. Heavy metal analysis from acid stressed and non-stressed lakes. Field work completed by October 1984. Preliminary summary report by February 1985.
3. Laboratory work completion (phase 1) by February 1985. Data Summary and preliminary report on more status by March 1985.
4. Preliminary report by April 1985 (work status) and final report/paper by April 1986.

Relevance/Objet

The microbiology laboratories section is currently interpreting information on baseline bacterial levels in acid stressed lakes and the effects of low pH stress on bacterial populations, morphology and activity. An extended study is required to provide high priority data to LRTAP to bridge information gaps in the area of environmental contaminants in aquatic ecology.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
641

STUDY TITLE TITRE D'ETUDE	Quality Assurance and Methods Section - Administration and Management	DIVISION AMD
KEY WORDS MOTS CLEFS	ADMINISTRATION, QUALITY CONTROL, METHODS DEVELOPMENT, MANAGEMENT	SECTION QAMS
STUDY LEADER/ CHEF D'ETUDE	Chau, A.S.Y.	TEL: 637-4653 PAE 1312 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE		FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT Apr. 1984 FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	M. Forbes, WQB - HQ	TEL: 997-1921 <u>INTEREST/INTERET DIRECT-GENERAL</u>

#### Goals/Buts

To administer and participate in the activities and projects of the Section to ensure that the objectives are met with maximum efficiency.

#### Performance Indicators/Indicateurs de rendement

1. Evaluation of experimental data and reports produced by QAMS.
2. Participation with staff on the experimental design of scientific investigation and research.
3. To write or participate in writing reports of QC studies and methods development.
4. Serve as a general referee of the Association of Official Analytical Chemists
5. Serve as a coordinator for the FICP (Federal Interdepartmental Committee on Pesticides) check sample program.
6. Serve as a Task Group Chairman in ASTM.
7. Advise customers and clients.

#### Relevance/Objet

To ensure that the objectives set for the section are met and the activities carried out efficiently.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
642

STUDY TITLE TITRE D'ETUDE	Organic Methods Development		DIVISION AMD
KEY WORDS MOTS CLEFS	TOXIC ORGANICS, METHODS DEVELOPMENT, TOXIC SUBSTANCES, PESTICIDES, PCB'S		SECTION QAMS
STUDY LEADER/ CHEF D'ETUDE	Stokker, Y.D.		TEL: 637-4653 PAE EAP 1312
TEAM MEMBERS/ MEMBRES D'EQUIPE	H.B. Lee		FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	
OPERATIONAL CONTACT OPERATIONNEL	J. Doul, WQB - AR		TEL: 388-6606 INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To develop a multi-class, multi-residue method for the analyses of organochlorinated pesticides (OCs), PCBs, and chlorobenzenes (CBs) in water and in sediments.
2. To expand existing method for the analysis of triazines in water and to modify it for future development into a multi-class method.

Performance Indicators/Indicateurs de rendement

1. Development of a multi-class, multi-residue method:
  - (a) extend literature methods, modify if necessary.
  - (b) validate the method individually for OCs/PCBs and for CBs (for water: June, for sediment: September).
  - (c) evaluate co-extraction, cleanup and sample applicability to natural waters (July) and different sediments (Oct.).
  - (d) submit report to client with single operator statement on precision, accuracy and detection limit at 2-3 concentration levels (Dec.).
2. Method development for triazines in water:
  - (a) investigate literature methods, modify if necessary (Apr.-Nov.).
  - (b) extraction, cleanup and determine sample applicability of the methods to natural waters (Jan. 1985).
  - (c) submit report to client with single operator statement on precision accuracy and detection limit at 2-3 concentration levels (Feb. 1985).

Relevance/Objet

There is a need to increase the number of organic compounds analyzed in a single sample in order to reduce the quantity of bulk sample handling (collection preservation, storage, shipping, etc.). This will therefore require an increased effort in the standardization of methodologies until a comprehensive, multi-class, multi-residue method is developed. (Requested by Atlantic Region and National W.Q. Lab.)

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 643
STUDY TITLE TITRE D'ETUDE	WQB and PPWB Quality Assurance Program		DIVISION AMD
KEY WORDS MOTS CLEFS	INTERLABORATORY STUDIES, DATA QUALITY, ANALYTICAL METHODS, PRAIRIES		SECTION QAMS
STUDY LEADER/ CHEF D'ETUDE	Alkema, H.	TEL: 637-4296/	PAE EAP 1312
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.S.Y. Chau		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	NWRI PPWB
OPERATIONAL CONTACT OPERATIONNEL	W. Gummer, WQB - W&NR	TEL: 359-5322	INTEREST/INTERET <u>DIRECT-GENERAL</u>

#### Goals/Buts

Complete two quality control studies every two months. These will include 5 WQB regional labs and 3 Prairie Province labs.

#### Performance Indicators/Indicateurs de rendement

Prepare and check test samples (ongoing). Distribute bimonthly test samples for approximately 40 inorganic parameters to 5 WQB and 3 PPWB laboratories. Evaluate data and generate a report (one every 2 months).

Prepare 3 reference waters to be used for the generation of precision and accuracy statements for the analysis of major ions and trace metals (ongoing).

#### Relevance/Objet

Requested by WQB/Headquarters and PPWB to ensure reliability and compatibility of data generated by WQB laboratories and Prairie Provinces Water Board laboratories. (Interregional, IWD/NWQL and PPWB.)

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
644

STUDY TITLE TITRE D'ETUDE	Certified Reference Materials (CRM), Methods, and Preservation for Inorganics			DIVISION AMD
KEY WORDS MOTS CLEFS	LRTAP, STANDARDS, QUALITY CONTROL, METHODS DEVELOPMENT, HUMIC ACIDS, TRACE METALS			SECTION QAMS
STUDY LEADER/ CHEF D'ETUDE	Cheam, V.		TEL: 637-4645	PAE EAP 1312
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.S.Y. Chau, 2 technologists (WQB)			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	December 1985 NWRI WQB
OPERATIONAL CONTACT OPERATIONNEL	M. Forbes, WQB - HQ		TEL: 997-1921	INTEREST/INTERET <u>DIRECT-GENERAL</u>

Goals/Buts

1. To develop a certified reference material (coloured and naturally contaminated with organics) for major ions with emphasis on SO<sub>4</sub>.
2. To develop preservation procedure for trace metals and other metals analyzed routinely by WQ labs.

Performance Indicators/Indicateurs de rendement

1. CRM Development
  - (a) Obtain naturally coloured water, filter into 1000 L storage tank (June 30).
  - (b) Homogenize, subsample and analyze 200-300 replicates by ion chromatography (December 1984).
  - (c) Set up an independent method for SO<sub>4</sub> by February 1985.
  - (d) Evaluate the above method with IC and WQB Technicon method (March 1985).
  - (e) Generate data and evaluate data from IC and the 3 methods and finalize certification (December 1985).
2. Preservation
  - (a) Conduct literature review and evaluation of current status by July 1984.
  - (b) Evaluation of current methods used by WQL by December 1984.
  - (c) Optimize preservation procedures for metals, identify areas that need research, report and recommend procedures by March 1985.

Relevance/Objet

1. At present time, there is no such CRM. It is essential for generation of reliable data in the regular WQB and LRTAP programs.
2. Due to lab centralization, WQB Headquarters request preservation procedures for all metals analyzed by NWQ Lab.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84- 645

STUDY TITLE TITRE D'ETUDE	Capital Equipment Acquisition (QAMS)		DIVISION AMD
KEY WORDS MOTS CLEFS	QUALITY CONTROL, METHODS DEVELOPMENT, CAPITAL, EQUIPMENT		SECTION QAMS
STUDY LEADER/ CHEF D'ETUDE	Chau, A.S.Y.		TEL: 637-4653 PAE 1312 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL: NWRI INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. To purchase capital equipment necessary for the implementation of 83/84 study plans according to the AMD capital acquisition plan.

#### Performance Indicators/Indicateurs de rendement

Funds to be committed by September 1984 for the purchase of the following items.

- a) Automatic sampler for HPLC (required for project 657)
- b) Mass Spectrometer Detector\* (required for project 657)

\* subject to supplementary Toxfund resources being available

#### Relevance/Objet

The fulfilment of the responsibilities of the Analytical Methods Division requires acquisition of new instrumentation reflecting the latest advances in analytical technology.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
650

STUDY TITLE TITRE D'ETUDE	IJC Quality Control	DIVISION AMD	
KEY WORDS MOTS CLEFS	IJC, GREAT LAKES, QUALITY CONTROL, SURVEILLANCE, DATA QUALITY	SECTION QAMS	
STUDY LEADER/ CHEF D'ETUDE	Aspila, K.I.	TEL: 637-4638 PAE 1113 EAP	
TEAM MEMBERS/ MEMBRES D'EQUIPE		FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN March 1985	GLWQA NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Warry, WQB - OR	TEL: 637-4641	INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

To respond to requests made by the IJC Surveillance Work Group and deliver interlab quality control studies to laboratories that support the institutions of the Canada-U.S. Great Lake Water Quality Agreement.

1. Distribute and complete study 47 - Toxic organics in fish (initiated in FY 83/84).
2. Prepare two interlab studies on aqueous constituents (inorganics) as requested by the Surveillance Work Group (SWG) or other institutions of the IJC.
3. Participate in Data Quality Work Group activities.

Performance Indicators/Indicateurs de rendement

1. Distribute Study 47 (April 1985). Prepare evaluation of the client laboratories of the Surveillance Work Group.
2. Prepare (April-September 1985) two interlab studies on inorganic constituents in water (e.g., Total P, trace metals or major ions) and distribute (1 in July 1985 and October 1985). It will be required that the SWG provide 6 months notice prior to distribution of these studies.
3. Ongoing.

Relevance/Objet

This project responds to the Canada-U.S. Great Lakes Water Quality Agreement requirement for reliable water quality data.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 651
STUDY TITLE TITRE D'ETUDE	LRTAP Interlaboratory Quality Control Studies		DIVISION AMD
KEY WORDS MOTS CLEFS	LRTAP, QUALITY CONTROL, NUTRIENTS, DATA QUALITY		SECTION QAMS
STUDY LEADER/ CHEF D'ETUDE	Aspila, K.I.	TEL: 637-4638	PAE EAP 4200
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.S.Y. Chau, S. Todd		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984	FINISH FIN	LRTAP NWRI
OPERATIONAL CONTACT OPERATIONNEL	G. Brun, WQB - AR	TEL: 388-6606	INTEREST/INTERET <u>DIRECT-GENERAL</u>

#### Goals/Buts

Define and improve the quality of data generated by laboratories that provide data to the federal-provincial LRTAP program.

#### Performance Indicators/Indicateurs de rendement

1. Generate reference material for major ions and nutrients in water to suit the needs of the LRTAP participants (ongoing).
2. Sample preparation, verification and distribution of 3 interlab studies for major ions and nutrients to 30-50 labs. (L6, L7, L8) (one study per 4 months)
3. Data evaluation and interpretation (ongoing).
4. Prepare final reports for each study (one report per every 4 months).
5. Generate new test samples for the program, to replace those being consumed (ongoing).
6. Investigate and ensure sample homogeneity and stability.
7. Refinement to our present computer programs for data evaluation (ongoing).
8. Maintain liaison with the analysts, managers, data users and the LRTAP subgroup.

#### Relevance/Objet

This study is in response to the quality assurance needs, as identified by the LRTAP quality assurance subgroup of the Federal-Provincial RMCC.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
652

STUDY TITLE TITRE D'ETUDE	Quality Assurance Program - Dredging			DIVISION AMD	
KEY WORDS MOTS CLEFS	IJC, TRACE METALS, QUALITY CONTROL, GREAT LAKES, WATER, SEDIMENTS, DREDGING, DATA QUALITY, ORGANICS			SECTION QAMS	
STUDY LEADER/ CHEF D'ETUDE	Lee, H.B.	TEL: 637-4653		PAE 1113 EAP	
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.S.Y. Chau, GLWQA Term PY			FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	Ongoing	NWR1 GLWQA
OPERATIONAL CONTACT OPERATIONNEL	T.J. Day, WRB - HQ			TEL: 997-1185	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To critically assess the quality of data obtained through laboratory analysis of water and sediments related to dredging project.
2. Provide a means of ongoing control of quality of these data.
3. Provide a means to ensure the precision and accuracy of data generated by various laboratories.
4. Develop and prepare suitable reference sediment samples to achieve the above goals.

Performance Indicators/Indicateurs de rendement

1. Write a report on the trace metals QA study initiated in 83/84 (May).
2. Design and conduct a QA study on organic parameters (Sept.) and write a report (Nov.).
3. Design and conduct a QA study on trace metals (Jan.) and write a report (March).
4. Initiate the preparation of reference materials for trace metals (March).
5. Develop computer programs for the evaluation of lab data (March).

Relevance/Objet

Through support of this proposal, Canada can meet its commitment made in Annex II of the GLWQA to undertake surveillance and monitoring programs as well as provide support to work being undertaken under GLWQA Article VI(g) to introduce measures to abate and control pollution from Great Lakes dredging activities.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
653

STUDY TITLE TITRE D'ETUDE	Organic Quality Assurance Program and SRM's	DIVISION AMD
KEY WORDS MOTS CLEFS	QUALITY CONTROL, TOXIC ORGANICS, STANDARD REFERENCE MATERIALS, PCB'S, PAHS	SECTION QAMS
STUDY LEADER/ CHEF D'ETUDE	Lee, H.B.	TEL: 637-4645 PAE 1312 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	A.S.Y. Chau	FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1984 FINISH FIN March 1985	NWRI TCMP
OPERATIONAL CONTACT OPERATIONNEL	J. Merriman, WQB - OR	TEL: 637-4643 INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. Extend and validate a method for the analysis of OCs, PCBs and chlorophenols in water.
2. Develop new CRMs for PAHs and chlorobenzenes of different concentrations and monitor long term stability.
3. Design and implement interlaboratory QA study for toxic organics and conduct QA study for FICP.

Performance Indicators/Indicateurs de rendement

1. Method validation:
  - (a) Validate an analytical method for OCs, PCBs, and chlorophenols in waters at two to three concentration levels (June).
  - (b) Write a report (July).
2. Development of CRMs:
  - (a) Set up in-house analysis for chlorobenzenes in EC-3 (Sept.).
  - (b) Evaluate all data (Oct.) and write a report (Nov.).
  - (c) Finalize all in-house PAH analysis (Feb.).
  - (d) Evaluate data and write a report (March 1985).
3. Initiate a National and PICP study for organics (March 1985).

Relevance/Objet

There is an urgent demand to increase the number of organic parameters included in QC programs. This project will involve increased effort in standardization of methodologies, preparation and certification of CRMs as well as implementation of QC activities.

NATIONAL WATER RESEARCH INSTITUTE  
L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX

Study Plan  
Plan d'étude

NO: 84-  
670

STUDY TITLE TITRE D'ETUDE	Computer Services for Water Management Research			DIVISION AMD
KEY WORDS MOTS CLEFS	COMPUTER, EDP CONSULTATION			SECTION CSS
STUDY LEADER/ CHEF D'ETUDE	Pulley, H.C.	TEL: 637-4209		PAE 1516 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	M. Kinder, U. Hamilton, B. Malseed, P. Moody, J. Foley			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	S. Whitlow, WQB - HQ		TEL: 997-3422	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

Provide centralized computing, plotting, and data entry services to all components of the Canada Centre for Inland Waters and external users approved by the Director, NWRI by:

- a) Conducting the procurement and installation of a new central computer system (tender, benchmark, evaluation, contract negotiation, system change over – any or all as required) jointly with Data Management, CASD, and DSS;
- b) Managing the installation effectively to provide maximum system availability to the user community.
- c) Providing operating system support and consultation to ensure that system usability is maintained.

Performance Indicators/Indicateurs de rendement

- a) Based on decisions made by the Department and Treasury Board, complete required phases in a timely manner (July 1985).
- b) Maintains a minimum monthly up-time for all systems of at least 95%.
- c) Analyze system software malfunctions within two days, report within one week, fix within two weeks (if local fix possible).
- d) Annual report due June 1985.

Relevance/Objet

This is an ongoing support service required for most areas of activity at CCIW.



# TECHNICAL OPERATIONS DIVISION



#### Technical Operations Division

The Technical Operations Division provides a wide variety of technical support to the field research studies of NWRI, its regions and, where possible, to other departments, agencies and universities.

Areas of responsibility include field measurement, sample collection and some basic analyses of physical, chemical, biological parameters and sediments from freshwater systems aboard major research ships, launches, shore-based field parties and diving operations. The Division is also responsible for the preparation, modification, field use and maintenance of a wide variety of mechanical, electronic and hydraulic sampling and data acquisition systems.

The Division arranges for the acquisition and scheduling of major research ships, launches and land sites; the co-ordination of all NWRI field research studies to ensure effective and efficient use of technical staff, vehicles and equipment. The Division also ensures a high level of safety for all field operations.



## STUDIES FOR TECHNICAL OPERATIONS DIVISION

SECTION	STUDY	STUDY TITLE	STUDY LEADER	84/05/01.
DIVISION	801 805	MANAGEMENT AND ADMINISTRATION SUPPORT TO EXTERNAL AGENCIES	MACDONALD, H. B. MACDONALD, H. B.	
SHIP SURVEY	803	OPEN LAKES SURVEILLANCE SUPPORT	HEALEY, P. M.	
FIELD SURVEY	802 804 807	LOGISTIC SUPPORT TO NWRI, FIELD EQUIPMENT AND VEHICLES COMMON-USER EQUIPMENT MAINTENANCE AND ACQUISITIONS UNDERWATER OPERATIONS AND REMOTE AREAS WORKING GROUP	TAYLOR, W. B. TAYLOR, W. B. TAYLOR, W. B.	
LIMNOLOGICAL INSTRUMENT	805	LIMNOLOGICAL / METEOROLOGICAL INSTRUMENTATION SUPPORT	DIAZ, J. A.	



## PROCESSING FORM FOR DIVISION TOD

DATE RUN 84/05/02.

ORGANIZATION				ENG/MANTEC				TECH OPERATIONS				DATA M- A BASE				EXTERNAL				SHADOW				TOTAL			
NO	PY SAL	OM	CAP	PY SAL	OM	CAP	PY SAL	OM	PY SAL	OM	CAP	COST	OM	CAP	PY SAL	OM	CAP	PY SAL	OM	CAP	PY SAL	OM	CAP	COST			
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NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 801		
STUDY TITLE TITRE D'ETUDE	Management and Administration		DIVISION TOD		
KEY WORDS MOTS CLEFS	ADMINISTRATION, MANAGEMENT, FIELD SUPPORT		SECTION TOPDIV		
STUDY LEADER/ CHEF D'ETUDE	Macdonald, H.B.	TEL: 637-4217	PAE EAP 1516		
TEAM MEMBERS/ MEMBRES D'EQUIPE	S.R. Mitchell		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	April 1966	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL	

#### Goals/Buts

1. To provide planning, direction and control of technical support to scientific studies.
2. To provide efficient administration of departmental regulations and to ensure complete and accurate records.
3. To provide full secretarial support to Division Chief and his staff of approximately 27.

#### Performance Indicators/Indicateurs de rendement

1. Provision of ongoing direction for support to scientific programs.
2. Allocate funds and approve expenditures within authority.
3. Provide ongoing office management and record-keeping. Type all cruise plans and reports in a timely fashion.

#### Relevance/Objet

To ensure high quality support to NWRI scientific studies is maintained and that funds are expended efficiently and in conformity with Departmental regulations.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
802

STUDY TITLE TITRE D'ETUDE	Logistic Support to NWRI, Field Equipment and Vehicles	DIVISION TOD
KEY WORDS MOTS CLEFS	EQUIPMENT, FIELD SUPPORT	SECTION FIELD/S
STUDY LEADER/ CHEF D'ETUDE	Taylor, W.B.	TEL: 637-4216 PAE 1516 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	W.D. Hunt, L.J. Lomas, G.M. Perigo	FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT Apr. 1966 FINISH FIN Ongoing	
OPERATIONAL CONTACT OPERATIONNEL	N/A	TEL: INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. To provide Warehousing and Field Equipment Stores in support of NWRI studies.
2. To provide a common vehicle pool in support of all scientific, operational and administrative activities conducted away from NWRI.

#### Performance Indicators/Indicateurs de rendement

1. (a) Produce detailed listing of field equipment for issue, updated at 6-month intervals.  
(b) Maintain records of Field Stores issues.
2. (a) Maintain vehicle assignment and maintenance schedules.  
(b) Produce monthly logs and FMIS reports to Ottawa.  
(c) Requisition required replacement vehicles for 85/86.  
(d) Maintain regional standing officers for vehicle repairs.

#### Relevance/Objet

To control, maintain and schedule a fleet of vehicles for use on all off-site research activities of NWRI and like research of external agencies, negating duplication of resources in this area, thus reducing government spending.

NATIONAL WATER RESEARCH INSTITUTE  
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Study Plan  
Plan d'étude

NO: 84-  
803

STUDY TITLE TITRE D'ETUDE	Open Lakes Surveillance Support			DIVISION TOD	
KEY WORDS MOTS CLEFS	SURVEILLANCE, IJC, WATER QUALITY			SECTION SHIP/S	
STUDY LEADER/ CHEF D'ETUDE	Healey, P.M.		TEL: 637-4215	PAE EAP 1113	
TEAM MEMBERS/ MEMBRES D'EQUIPE	Various Technical Operations Division Staff			FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT	Apr. 1974	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	D. Williams, IWD - OR		TEL: 637-4531		INTEREST/INTERET <u>DIRECT</u> -GENERAL

Goals/Buts

To provide the expertise and support to carry out the Surveillance Program (GLISP) and Biological Index Monitoring Study in support of IWD-OR, CWS and GLFRB by:

1. Logistics management and co-ordination of these programs and provision of technical support, expertise and equipment.
2. Writing of cruise plans and reports for individual cruises and writing preliminary descriptive reports.
3. Logistics input to the Surveillance Working Committee.
4. Providing technical and logistic support to CWS and GLFRB, PFF/DFO.

Performance Indicators/Indicateurs de rendement

1. Scheduling of requested vessel, equipment and technical support in the required time frames.
2. Successful commencement and completion of the requested shipboard and field studies with the necessary documentation (cruise plans, cruise reports or work plans) in the scheduled times and with the allocated resources.
3. Immediate availability of historic and present information on methodology of sampling, duration of time required for completion of cruises on individual lakes, costs of cruises, etc., for the Surveillance Program.
4. Availability of vessel and/or launch support in the requested time frame, plus the availability of technical support and equipment to conduct these studies within the resources allocated.

Relevance/Objet

To provide technical support to furnish a continuing report on long term information of water quality and eutrophication parameters in the Great Lakes. To supply technical support and expertise to provide input required for the Surveillance Program under the Canada/U.S. Agreement and the Water Quality Board Annual Report to the International Joint Commission.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 804
STUDY TITLE TITRE D'ETUDE	Common-User Equipment Maintenance and Acquisitions		DIVISION TOD
KEY WORDS MOTS CLEFS	EQUIPMENT, FIELD SUPPORT		SECTION FIELD/S
STUDY LEADER/ CHEF D'ETUDE	Taylor, W.B.		PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	J.A. Diaz, P.M. Healey, M.R. Mawhinney		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1966	FINISH FIN Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	I.J. Stewart, WRB - P&YR		TEL: 666-3604 <u>INTEREST/INTERET DIRECT-GENERAL</u>

#### Goals/Buts

1. Update the inventory for capital equipment under TOD responsibility.
2. Upgrade, replace or dispose of lost, damaged or worn-out equipment.
3. Maintain all equipment under T/OPS jurisdiction.
4. Continue coring support as required.
5. Investigate new equipment on the market and determine its common-user application.

#### Performance Indicators/Indicateurs de rendement

1. Updated inventory listing to be prepared by March 1, 1985.
2. To have all equipment processed through CADC by March 31, 1985.
3. Monitor maintenance program through meetings and reports (ongoing throughout fiscal year 1984/85).
4. Meet all requests received for coring support.
5. Through reference to technical journals and manufacturers' catalogues, determine the state-of-the-art equipment having direct applications to NWRI research needs and replacing or modifying existing equipment accordingly.

#### Relevance/Objet

Ensure that the equipment and instrumentation meets the requirements of NWRI research needs as well as those of the IWD-Ontario/Pacific & Yukon/Western & Northern/Quebec/Atlantic Regions.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 805
STUDY TITLE TITRE D'ETUDE	Support To External Agencies		DIVISION TOD
KEY WORDS MOTS CLEFS	FIELD SUPPORT, EQUIPMENT, INSTRUMENTATION		SECTION FIELD/S
STUDY LEADER/ CHEF D'ETUDE	Macdonald, H.B.	TEL: 637-4217	PAE EAP 1113
TEAM MEMBERS/ MEMBRES D'EQUIPE	P.M. Healey, W.B. Taylor, J.A. Diaz		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1966	FINISH FIN Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:  INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. To provide logistic support, equipment, instrumentation and field assistance as resources permit to agencies outside of NWRI.
2. To provide technical advice and guidance as requested.

#### Performance Indicators/Indicateurs de rendement

1. To record and report on all support (both manpower and financial) provided to external agencies.
2. To respond to all requests for technical advice and guidance.

#### Relevance/Objet

The efficient utilization of support resources at Burlington reduces the need for duplication and increased government spending on programs which are closely related to those of agencies outside NWRI (GLFRB/PFF, BLMSS/DFO & universities).

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NO: 84-  
806

STUDY TITLE TITRE D'ETUDE	Limnological/Meteorological Instrumentation Support			DIVISION TOD
KEY WORDS MOTS CLEFS	MAINTENANCE, INSTRUMENTATION, EQUIPMENT, CALIBRATION, CURRENT METER, METEOROLOGY, LIMNOLOGY			SECTION LIM/INST
STUDY LEADER/ CHEF D'ETUDE	Diaz, J.A.			TEL: 637-4215 PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	J.A. Tyler, E.G. Smith			FUNDING SOURCE FINANCEMENT NWRI
TIME FRAME CALENDRIER	START DEBUT	Apr. 1971	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	N/A			TEL: INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To continue ongoing programs of maintenance, calibration, modification and upgrading of self-recording current meters, digitizers, electro-bathythermograph units, shipboard transmissivity measuring systems, rosette water sampling systems, meteorological data acquisition systems, solar radiation recording systems, underwater acoustic systems and all ancillary equipment associated with the above system.
2. To provide expertise and field support in installation and servicing of electronic instrumentation at field sites, onboard major and minor research vessels, launches for NWRI, Regional and Outside Agencies.
3. To investigate state-of-the-art improvements that could optimize equipment performance and incorporate these improvements into existing equipment where applicable.

Performance Indicators/Indicateurs de rendement

1. To supply serviceable limnological instrumentation systems as and when requested for approved study programs within stated time frames.
2. To meet all requests for support to NWRI research and that of outside agencies, ensuring that data collected is complete and accurate.
3. Through reference to technical journals and manufacturers' catalogues, determine the state-of-the-art equipment having direct applications to NWRI research needs and replacing or modifying existing equipment.

Relevance/Objet

Immediate response to requests for equipment and service is possible due to the unique, multi-faceted support structure of T/OPS. The equipment covers a vast range of old and newly-developed, complex, highly sophisticated electronic instrumentation. The quality of usable data depends on the high degree of maintenance and calibration established. The scientific Study Leader is relieved of equipment logistics, maintenance and calibration.

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NO: 84-  
807

STUDY TITLE TITRE D'ETUDE	Underwater Operations and Remote Areas Working Group			DIVISION TOD
KEY WORDS MOTS CLEFS	DIVING, FIELD SUPPORT, EQUIPMENT, TRAINING			SECTION FIELD/S
STUDY LEADER/ CHEF D'ETUDE	Taylor, W.B.	TEL: 637-4216		PAE EAP 1516
TEAM MEMBERS/ MEMBRES D'EQUIPE	F.H. Don, J.A. Diaz, K.J. Hill, G.D. Bruce C. Bisutti			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	Apr. 1970	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	D. Haffner, WQB - HQ		TEL:	997-3422
<u>INTEREST/INTERET DIRECT-GENERAL</u>				

Goals/Buts

1. Co-ordinate the diving requirements for NWRI and all other agencies at CCIW, provide a training program, ensuring a high level of safety in all operations.
2. To provide diving equipment to meet operational requirements and conduct routine maintenance.
3. Represent DOE as Chairperson of the Departmental Diving Committee.
4. Continue co-ordination of a Remote Areas Working Group, to provide common-user equipment and procedures specific to the needs of studies being conducted in remote areas.

Performance Indicators/Indicateurs de rendement

1. Report in the Annual Activity Summary support given to NWRI and to other CCIW agencies, meeting all requests as resources permit in a timely fashion and conduct annual diving refresher courses.
2. Procure equipment for operational requirements, maintain records on equipment maintenance.
3. Conduct meetings and provide minutes of DOE Diving Committee.
4. Conduct 2 field operations in remote areas in support of NWRI research studies and assess equipment performance.

Relevance/Objet

Maintenance of a high level of diving expertise is vital to the success of many research studies where underwater work is conducted. Remote areas research requires the efficient use of existing resources and maximum safety of operations.



# STAFF SERVICES DIVISION



## Staff Services Division

This Division provides central services to the National Water Research Institute and other tenant agencies at the Canada Centre for Inland Waters. Such services provide for:

- (a) initiatives to improve management practices and controls;
- (b) effective and efficient financial and materiel management services for NWRI and associated ECS agencies;
- (c) simplified and, where possible, automated administrative practices to NWRI management, ensuring that these practices are uniform throughout the Institute and responsive to NWRI management and higher authority;
- (d) cost-effective building, safety, security and industrial health services for all CCIW tenants;
- (e) library services which respond to the changing needs of the CCIW research community;
- (f) coordination of the program to take affirmative action for hiring of under-represented groups; and
- (g) comprehensive and timely information service to respond to Access to Information legislation, to increase public awareness of the importance of all aspects of water resources research and to indicate the extent of DOE activities and their positive effect on the local economy.



## STUDIES FOR STAFF SERVICES DIVISION

SECTION	STUDY	STUDY TITLE	STUDY LEADER
DIVISION	901	ADMINISTRATION (DSS)	SMITH, J. D.
	902	ADMINISTRATION (PERSONNEL)	FINDLAY, J. B.
	903	ADVISORY COMMITTEE ON UNDER-REPRESENTED GROUPS	NAMETH, S. G.
MATERIAL MANAGEMENT	904	ADMINISTRATION (MATERIEL MANAGEMENT)	PAINTER, S.
CENTRAL REGISTRY	905	ADMINISTRATION (CENTRAL REGISTRY)	BURTON, D.
FINANCE	906	ADMINISTRATION (FINANCE)	MITCHELL, A.
BUILDING AND PROPERTIES	907	CCIW PHYSICAL PLANT	STEWART, D. F.
LIBRARY SERVICES	909	LIBRARY	DAWIE, E.

84/05/01.



PROCESSING FORMS FOR DIVISION SSD

DATE RUN 94/05/12.



NATIONAL WATER RESEARCH INSTITUTE  
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NO: 84-  
901

STUDY TITLE TITRE D'ETUDE	Administration			DIVISION SSD
KEY WORDS MOTS CLEFS	PLAN, MANAGEMENT			SECTION SSDDIV
STUDY LEADER/ CHEF D'ETUDE	Smith, J.D.		TEL: 637-4656	PAE EAP 1631
TEAM MEMBERS/ MEMBRES D'EQUIPE	S.C. Smith, F. Boyd, C.D. Leacock, C. Kennedy, R.J. Gray, H. Zrostek			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	Apr. 1981	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To simplify and, whenever possible, automate administrative practices in NWRI and ensure that these practices are uniform throughout the Institute and responsive to NWRI personnel and higher authority.
2. Expand the duties and, with training, enhance the capabilities of Administrative Officers (A.O.s) to improve the level of administrative support provided to Division Chiefs and to NWQL.
3. By directing the efforts of the Administrative Team along a common path, enhance the Institute's ability to respond to HQ directives on matters which affect all Divisions (e.g., staffing, student employment, official languages, and safety).
4. By training and phased introduction of office automation, provide the Institute with automated information retrieval and enhanced word processing capabilities.
5. Produce Phase II of the Institute Training Plan, placing emphasis on Safety.
6. Devise audit models to facilitate the internal audit of all aspects of Institute Support Operations.
7. Monitor contract for Public Information Consultant.
8. Review SSD operations to ensure all possible economies are in place and that tenants are paying an equitable share of specific operating costs.

Performance Indicators/Indicateurs de rendement

1. Conduct bi-weekly meetings of Administrative Team & produce by June 30, 1984, a WANG USERS MANUAL.
2. Assign Institute-wide responsibilities to A.O.s on a rotation basis and train a second A.O. in office automation. Provide timely administrative services to the NWQL.
3. Respond to H.Q. requests in a timely fashion.
4. Office automation plan for 1984.
5. Phase II of the Training Plan to be organized and in place by 31 August 1984.
6. Ongoing.
7. Report progress of contract to CCIW Executive Committee and ensure financial limit is not exceeded.
8. Director, NWRI, to be provided with report by not later than 1 September, 1984.

Relevance/Objet

To provide administrative services to the Director, NWRI, to the Director IWD-OR, to the Chief, NWQL, and to the DG-DFO, in support of the research mandates of the CCIW.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 902		
STUDY TITLE TITRE D'ETUDE	Administration (DSS)		DIVISION SSD		
KEY WORDS MOTS CLEFS	PROCUREMENT, CONTRACTS		SECTION SSDDIV		
STUDY LEADER/ CHEF D'ETUDE	Findlay, J.B.	TEL: 637-4300	PAE EAP 1631		
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Ceolin		FUNDING SOURCE FINANCEMENT		
TIME FRAME CALENDRIER	START DEBUT	Apr. 1981	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A			TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To provide low dollar value purchasing services for all government departments located at CCIW, ensuring that they are carried out in a cost-effective manner in accordance with the Government of Canada Supply and Services Act.

Performance Indicators/Indicateurs de rendement

1. Optimum service in a timely fashion to all CCIW agencies on a day-to-day basis.

Relevance/Objet

To ensure optimum service to the Department in all matters relating to purchasing.

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NO: 84-  
903

STUDY TITLE TITRE D'ETUDE	Administration (Personnel)			DIVISION SSD
KEY WORDS MOTS CLEFS	CLASSIFICATION, STAFFING, PERSONNEL			SECTION SSDDIV
STUDY LEADER/ CHEF D'ETUDE	Nameth, S.G.		TEL: 637-4591	PAE EAP 1631
TEAM MEMBERS/ MEMBRES D'EQUIPE	S.C. Pettit, B.J. Wydryk, K. Mawbey, S. St. Laurent, C.A. Desjardins, D. O'Hagan (Term), B. Martin (Term)			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	Apr. 1984	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL	N/A			TEL: NWRI
				INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To provide staffing, classification, staff relations, pay and benefits, training and human resources planning services for all DOE components headquartered at CCIW.

(The expenditure of NWRI O&M funds relates to telephone and stationery expenses incurred by the Personnel Unit and does not relate to the Unit's Work Plan. This section of the Annual Study Plan is therefore not completed.)

Performance Indicators/Indicateurs de rendement

To provide optimum personnel services on a day-to-day basis.

Relevance/Objet

To ensure optimum management and utilization of local departmental human resources and that all aspects of personnel legislation and regulations and associated central agency and departmental policies are adhered to.

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NO: 84-  
904

STUDY TITLE TITRE D'ETUDE	Administration (Materiel Management)			DIVISION SSD
KEY WORDS MOTS CLEFS	MATERIEL MANAGEMENT, PROCUREMENT, STORES			SECTION MATRL
STUDY LEADER/ CHEF D'ETUDE	Burton, D.		TEL: 637-4391	PAE EAP 1631
TEAM MEMBERS/ MEMBRES D'EQUIPE	S.E. Hicks, J. Mellon, M. Eadie, W. Coventry, M. Ross			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1981	FINISH FIN	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

1. To provide, on a continuing basis the full scope of materiel management services, i.e., procurement, inventory control and assets management, disposal, warehousing and stores, shipping/receiving and motor vehicle maintenance and reporting. Services to be provided in a manner which will ensure optimum usage and benefits of all materiel resources available in CCIW for all units supported by this Section.
2. Introduce a centralized Materiel Management System, to include automatic replenishment, through which all materiel used in NWRI and associated units, will be issued and received.
3. Automate document procedures associated with procurement, issue and receipt of materiel.

#### Performance Indicators/Indicateurs de rendement

1. Services to be provided on a daily basis.
2. System to be devised and in place by 31 December 1984.
3. Automation of documentation to continue throughout the year.

#### Relevance/Objet

To provide Materiel Management services to the Director, NWRI, to the Director IWD-OR, to the Chief, NWQL, and to the DG-DFO, in support of the research mandate of ECS agencies at the CCIW.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 905
STUDY TITLE TITRE D'ETUDE	Administration (Central Registry)		DIVISION SSD
KEY WORDS MOTS CLEFS	RECORDS MANAGEMENT		SECTION CR
STUDY LEADER/ CHEF D'ETUDE	Rae, E.		TEL: 637-4275 PAE 1631 EAP
TEAM MEMBERS/ MEMBRES D'EQUIPE	M. Solvason (Part-Time), J. Sims (Part-Time), D. Foran		FUNDING SOURCE FINANCEMENT  NWRI
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:  INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. To provide management of records, mail services, telex and telecopy services, and maintain duplicating facilities for departments located at CCIW. Services to be provided in an efficient, cost-effective manner to ensure that scientific programs are not impeded by administrative delays.
2. Review Central Registry procedures and automate, where possible, all routine clerical functions.
3. Review filing equipment facilities and space requirements for records to ensure record retrieval services are provided in an efficient and cost-effective manner.
4. Maintain accurate records on cost of Central Registry services provided to other Government departments and other DOE/ECS agencies in CCIW.

Performance Indicators/Indicateurs de rendement

1. Provide optimum and timely services on a daily basis.
2. To conduct a feasibility review of the development of an automated central records system.
3. Complete review and implement change where required.
4. Maintain records and report findings to Chief, SSD.

Relevance/Objet

To provide registry services to the Director, NWRI, to the Director IWD-OR, to the Chief, NWQL, and to the DG-DFO, in support of the research mandate of all ECS services at CCIW.

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Study Plan  
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NO: 84- 906

STUDY TITLE TITRE D'ETUDE	Administration (Finance)		DIVISION SSD
KEY WORDS MOTS CLEFS	BUDGETS, CAPITAL, FINANCE		SECTION FINS
STUDY LEADER/ CHEF D'ETUDE	Mitchell, A.	TEL: 637-4681	PAE EAP 1630
TEAM MEMBERS/ MEMBRES D'EQUIPE	Y. Hutton, B. Titley, E. Wendel, R. Haswell, D. Jefferson		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT Apr. 1981	FINISH FIN Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A	TEL:	INTEREST/INTERET DIRECT-GENERAL

Goals/Buts

1. Provide financial accounting and reporting services to all ECS units located at CCIW by maintaining records of allocations, expenditures and commitments, processing all accounts payable, travel, relocations and miscellaneous claims, receiving and issuing Receiver General pay cheques, maintaining a petty cash fund and making deposits to the Receiver General Transfer Account.
2. Continue the review of accounts payable and procurement procedures and automate, where possible, all routine clerical functions.
3. Provide input to the Finance Section of the Institute Administrative Procedures.
4. Provide cross-training of Accounts Clerks.
5. Meet H.Q. deadlines for all reports and returns.
6. Provide pay administration for all ECS units located at CCIW and in WSC-Guelph.
7. Review and collate Division estimates and prepare NWRI Main Estimates submission.

Performance Indicators/Indicateurs de rendement

1. Meet day-to-day requirements for IWD-Ontario, Lands-Ontario and the NWRI together with GLWQP funding from RDG-Ontario.
2. Automate to the WANG system where applicable.
3. Complete this requirement by not later than 31 August 1984.
4. Implement training plan based on a job description common to all Finance clerks by 15 August 1984.
5. Meet all deadlines as required.
6. Ongoing requirement.
7. Main Estimates to be submitted to IWD/HQ 15 September, 1984.

Relevance/Objet

To provide financial services to the Director, NWRI, in support of the research mandates of ECS agencies at CCIW.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 907		
STUDY TITLE TITRE D'ETUDE	CCIW Physical Plant		DIVISION SSD		
KEY WORDS MOTS CLEFS	PLANT, MAINTENANCE		SECTION B/PROS		
STUDY LEADER/ CHEF D'ETUDE	Stewart, D.F.		TEL: 637-4500	PAE EAP	
TEAM MEMBERS/ MEMBRES D'EQUIPE	J.C. Stewart, D.J. Smit, C.K. Platt, K. Taylor, A.K. Allaby, D.C. Clewley, J.P. Denomme, W.A. Johnson, T. Comiskey, S. Wyne, F. Adams			FUNDING SOURCE FINANCEMENT	
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	Apr. 1966	Ongoing	NWRI
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL:	INTEREST/INTERET DIRECT-GENERAL	

#### Goals/Buts

1. Maintain CCIW buildings and plant and progress the orderly development of the Centre, as necessary, to sustain CCIW research program.
2. Maintain a CCIW development and maintenance plan for buildings and their integral equipment, which includes maintenance and construction costs and associated life-cycle, cost-analysis data.
3. Review all B&PS clerical procedures and automate where possible.
4. Using word processing facilities, create and maintain a record of CCIW space allocations.
5. Progress energy conservation endeavours.

#### Performance Indicators/Indicateurs de rendement

1. Provide optimum service for daily requirements.
2. Pertinent data to be included in plan as maintenance and construction costs occur.
3. Draft submissions for review of CSSD by September 1984.
4. Prepare listing by August 1984.
5. Progress all B&P work with a view to energy conservation.

#### Relevance/Objet

Provision of building and property services to the Director, NWRI, to the Director IWD-OR, to the Chief, NWQL, and to the DG-DFO, in support of the research mandates of CCIW.

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NO: 84-  
909

STUDY TITLE TITRE D'ETUDE	Library			DIVISION SSD
KEY WORDS MOTS CLEFS	LIBRARY, PLAN			SECTION LIBRAS
STUDY LEADER/ CHEF D'ETUDE	Dowie, E.		TEL: 637-4530	PAE EAP 1660
TEAM MEMBERS/ MEMBRES D'EQUIPE	P. Haley, P. Bennett, (Part-time), K. Finch, J. Tinney			FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	Apr. 1981	FINISH FIN	Ongoing
OPERATIONAL CONTACT OPERATIONNEL				TEL: N/A

Goals/Buts

1. To ensure that the Library continues to respond to the changing needs of the research community, within the constraints of limited financial and PY resources.
2. Contingent upon FTC Library staff being hired and trained, continue initiatives to a) reduce cataloguing backlogs and b) increase the integrity of card catalogue.
3. Subject to a full complement of trained FTC Library staff, complete a comprehensive bibliographic survey on the formulation of collection policies and liaise with similar institutes in order to avoid common pitfalls in assessing collection needs.
4. Subject to the approval of funding, and a significant increase in collection budget, implement phase 1 of the DOBIS automated library system, with the first priority being given to the cataloguing functions.
5. Subject to the provision of funds, consider capital purchase of equipment, e.g., typewriter, microfiche cabinet.

Performance Indicators/Indicateurs de rendement

1. Provide optimum services in a timely fashion on a daily basis, where possible.
2. Progress a) to reduce by 20%, if possible; b) to continue this long-term project.
3. Completion of the bibliographic survey by December 1984; completion of liaison by April, 1985.
4. Equipment operational by September 1984; training of library staff completed by April 1985; provide the first DOBIS products available to CCIW Staff by April 1985.
5. Equipment purchased by June 1984.

Relevance/Objet

To provide library services to CCIW Scientific staff in support of the research mandate of CCIW.

NATIONAL WATER RESEARCH INSTITUTE L'INSTITUT NATIONAL DE RECHERCHE SUR LES EAUX		Study Plan Plan d'étude	NO: 84- 910
STUDY TITLE TITRE D'ETUDE	Advisory Committee on Under-Represented Groups		DIVISION SSD
KEY WORDS MOTS CLEFS	EQUAL OPPORTUNITIES FOR WOMEN, AFFIRMATIVE ACTION		SECTION SSDDIV
STUDY LEADER/ CHEF D'ETUDE	Painter, S.		PAE EAP 1631
TEAM MEMBERS/ MEMBRES D'EQUIPE	J. Stafford, C. Bishop, A. Sudar, K.L. Taylor		FUNDING SOURCE FINANCEMENT
TIME FRAME CALENDRIER	START DEBUT	FINISH FIN	MARCH 1985
OPERATIONAL CONTACT OPERATIONNEL	N/A		TEL: INTEREST/INTERET DIRECT-GENERAL

#### Goals/Buts

To advise management on issues pertinent to under-represented groups at CCIW.  
Specific activities for the 84/85 year are:

1. Report on Training and Development Program funds.
2. Analyze and report on Questionnaire circulated in early 1984.
3. Produce and circulate several newsletters.
4. Interface with management on implementation of Office Automation to advise management on possible implications for under-represented groups.

#### Performance Indicators/Indicateurs de rendement

1. Report on Training and Development funds for March 1985.
2. Report on Questionnaire for January 1985.
3. Newsletters produced every third month.
4. Office Automation - initial report by March 1985.

#### Relevance/Objet

Environment Canada is participating in the affirmative action programs established by Treasury Board. Our committee will act on the Affirmative Action goals established by the DG as they pertain to Environment Canada staff at CCIW.













